The Marquis of Stafford.

16766

TRANSACTIONS

OF THE

SOCIETY,

INSTITUTED AT LONDON

FOR

ENCOURAGEMENT

OF

ARTS, MANUFACTURES, and COMMERCE;

WITH THE

PREMIUMS offered in the YEAR 1788.

VOL. VI.

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M,DCC,LXXXVIII.

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PREFACE.

TO each of the foregoing Volumes of theſe Tranſactions, a Frontiſpiece has been prefixed, and as no one appears to this Book, ſome reaſon may be required why ſuch omiſſion has this year happened; it is therefore judged proper to inform the reader, that a Print, executed by Francis Bartolozzi, Eſq; R. A. of the Statue of Venus, which ornaments the Society's Room, and is the work of John Bacon, Eſq; R A. was intended as a Frontiſpiece to this Volume, had not Mr Bartolozzi, from indiſpoſition and numerous avocations, been prevented finiſhing the Plate in due time for its inſertion this year; but as that celebrated Artiſt has promiſed to compleat the Engraving, for

the next Volume, it is hoped what is here ſaid will be received by the Publick, as a ſufficient apology for the want of a Frontiſpiece to this Book, which, however it may ſuffer in point of elegance from this unavoidable accident, will nevertheleſs be found to contain five Plates of conſiderable merit and utility.

On the peruſal of the ſeveral Papers which conſtitute this Volume, it muſt afford great ſatisfaction to every reader to obſerve the great progreſs now making in the different parts of the Kingdom, in the various branches of Agriculture, and the other uſeful Arts which are the more immediate objects of the Society's attention and encouragement.

Among thoſe Papers that relate to Agriculture, will be found a full account of ſome large Plantations made in Scotland,

land, by the Earl of Fife, and in England, by the Reverend Mr Lloyd, and Mr White, who has already been so frequently mentioned in the foregoing Volumes of these Transactions: Under this head also is inserted an account of a considerable quantity of land gained from the Sea, on the coast of Essex, by the care and attention, and at the expense of the Reverend Henry Bate Dudley. The many places on the coast of Great Britain where good land is occasionally overflowed by the Sea, and thus rendered useless, makes every attempt to recover and enclose such ground, highly deserving the regard and attention of the Publick and the Society.

Here too will be found a Paper from Mr Professor Ross of Aberdeen, on the culture of the Turnep-rooted Cabbage; a Plant, through the medium of this So-

ciety, and by the ſedulous attention of that gentleman, now cultivating to advantage in the northern parts of this Iſland.

Under the article of Agriculture is alſo inſerted a full account of the Drill Huſbandry, tried on a ſcale hitherto unattempted, and with a degree of ſucceſs that fully juſtifies an opinion long embraced by many intelligent Perſons, that the Drill Huſbandry, at leaſt on ſoils adapted to it, has great advantage over the Broad-caſt method; and there is little doubt that in this age of experiment and obſervation, when Agriculture has ſo deſervedly become the object of ſerious attention among ſome of the firſt characters in the Kingdom, the experiments of Mr Boote, will induce ſuch trials to be made as may effectually decide that queſtion ſo long agitated by Agriculturiſts, on the general comparative advantages of the

the Drill and Broad-caſt Huſbandry in the culture of Grain.

The many and important uſes to which Alkaline Salts are applicable in Medicine, Bleaching, Glaſs-making, Soap-making, Dying, &c. will render the account of the diſcovery of a Native Foſſil Alkali, at Bombay, inſerted under the head of Chemiſtry, an object of conſiderable importance to many Manufacturers in theſe Kingdoms; for although the preſent price of Barilla is ſuch, as renders the importation of this kind of Foſſil Alkali, of leſs conſequence than might be expected; yet in time of war, when the price of that neceſſary article riſes very high, it may become convenient to import this material from the Eaſt Indies, for the ſupply of thoſe works which it is impoſſible to carry on without a Salt of this nature; and the account of the experi-

ments on this ſubſtance, made by that learned and accurate Chemiſt, Mr Kier, will render the Paper inſerted in this Volume, equally ſatisfactory to the Philoſopher and Manufacturer.

Under the claſs of Polite Arts, will be found a Letter on the Survey of the County of Lancaſter; and it is but juſtice to Mr Yates, to ſay, that from a moſt exact and attentive enquiry, it appeared his Map was fully deſerving the honour the Society conferred upon him.

In MANUFACTURES, the reader will find an account of making Paper from Raw Vegetable Subſtances, which, if it has ever been practiſed abroad, does not appear to have been yet brought forward on a ſcale of buſineſs in theſe Kingdoms, but from the ſucceſs that has attended theſe firſt experiments, promiſes to become

come a matter of ſome importance. Under this head, is alſo inſerted ſome Letters from a well known Artiſt, and a Copper-plate Printer, on the quality of that Paper, for which the Gold Medal was adjudged to Mr Bates of Wickham Marſh, in Buckinghamſhire; and which, on trial, appears equally fit as that imported, for taking Impreſſions from Engraved Copper-plates.

As from the Letters of Miſs Rhodes and others, inſerted in the former Volumes of theſe Tranſactions, it ſeems probable, that the breeding Silk Worms, and the culture of Silk, may one day become an object of great conſequence to theſe Kingdoms. The reader will be pleaſed to find under the head of Manufactures, a Letter inſerted from a gentleman whoſe abilities in that line, are univerſally and deſervedly acknowledged.

Under

Under the article of MECHANICKS, may be ſeen a Plate and Deſcription of an Inſtrument for meaſuring Angles, which it is preſumed will anſwer the purpoſe it is contrived for, more commodiouſly and more accurately, than thoſe hitherto uſed. A deſcription and two Plates of a Machine for ſetting Wheels and Pinions in Watch work, with more truth and accuracy than by thoſe in common uſe, are alſo here given, and it is believed will anſwer ſome very good purpoſes, to the ingenious Artiſts employed in the buſineſs of Watch and Clock-making.

The inconveniencies that frequently attend the removal of large Maſſes of Stone or Bodies of Trees, over ſoft or moraſſy Ground, occaſioned the Society to offer a Premium for the beſt contrived Carriage to obviate thoſe difficulties; and this

this year, one has been produced, that promiſes effectually to anſwer the end propoſed: Of this Carriage, and the neceſſary apparatus, two Plates and a full Deſcription, are given in this Volume, and a Model is reſerved in the Society's Repoſitory.

As a compleat Machine for this purpoſe, is much wiſhed for, if hereafter any perſon ſhould improve on the preſent conſtruction, an account of ſuch improvements will be highly acceptable to the Society.

The very conſiderable acceſſion of Members, which the Society has of late happily experienced, has enabled them to offer ſeveral new Premiums; ſome of which it may not be improper to enumerate.

In Agriculture.

The Silver Fir, having been ſaid to produce a very good kind of Wood, ſuperior to moſt others of the Fir tribe, a Premium has been offered, or rather revived, for promoting the growth of that tree.

The culture of the Turnep-rooted Cabbage being become an object of conſiderable attention, and many Farmers imagining that the tranſplanting them is attended with more expenſe than it really is, have been debarred propagating that uſeful Plant, ſome gentlemen have been led to cultivate it by ſowing the ſeed broad-caſt, and hoeing the intervals, and are ſaid to have ſucceeded in this manner: It has therefore been judged proper to offer a Premium for aſcertaining the comparative advantage of the culture of the Turnep-rooted Cabbage, by

ſowing

ſowing it broad-caſt and hoeing out the Plants, as practiſed with the common Turnep, or by ſowing the ſeed in Nurſeries, and tranſplanting the Plants, hoeing the intervals.—It is probable, that by offering this Premium, the Society will obtain ſatisfactory accounts on this ſubject, which cannot fail of being very advantageous to the Publick.

The cure of that diſeaſe in Potatoes, called the CURLED POTATOE, has alſo become an object of the Society's conſideration, and a Premium is now offered for a method of preventing that diſorder.

As in the Drill-huſbandry, hoeing the land is univerſally acknowledged to be of the firſt importance, an improvement in the Horſe or Hand Hoe, has been judged worthy attention.

In Chemistry.

The many and fatal diſorders that afflict the workmen, employed in the making and uſing White Lead, are too well known, and the Society have judged the making White Lead, or the diſcovering a ſubſtitute for it, which ſhall be free from all its noxious qualities, fit ſubjects of their attention, and have therefore thought proper to offer two Premiums, the one for improving the White Lead, the other, for diſcovering a proper ſubſtitute: It is obvious great advantages would ariſe, ſhould the offering theſe Premiums be attended with the wiſhed for ſucceſs.

In Polite Arts.

An honorary mark of the Society's attention, is offered to the Perſon who ſhall produce

produce the beſt Copy of a Portrait of the late Mr Stock of Hampſtead, who by Will bequeathed a ſum of money to be annually offered by them, for promoting the Arts of Painting, Sculpture and Architecture.

As a knowledge of the Natural Productions of the ſeveral parts of the Kingdom, muſt tend, in an eminent degree, to the perfecting thoſe Manufactures already eſtabliſhed, and to the introducing others not hitherto practiſed in theſe Kingdoms, the Society, have now offered the moſt diſtinguiſhing mark of their approbation, to the author who ſhall publiſh the Natural Hiſtory of any of the Counties of England or Wales, at the ſame time guarding the conditions of the Premium in ſuch manner, that the Work may have a clear tendency to the promoting the Arts and Manufactures of the Kingdom at large.

In Mechanicks.

In this Maritime Country, all things relating to the ſafety of the Navy, merit the moſt attentive conſideration, and the importance of connecting and ſecuring the parts of Ships, by well driving the Bolts, eſpecially ſince the uſe of Copper is become ſo general, is well known, a Premium is therefore offered for diſcovering a method ſuperior to any in practice, for performing this neceſſary work.

The enormous price to which Hemp has lately riſen, and the conſideration that the far greater part made uſe of, is of foreign growth, has induced the Society to offer a conſiderable Reward for the introducing Metal in the room of Hemp, for many purpoſes wherein that material has hitherto been employed; a conſiderable Premium is therefore this year offered

fered, for a Metal Rope or Chain, that ſhall fully anſwer the purpoſe of a ſtrong Hempen Rope. The dampneſs of deep Mines, and the heat of large Foundries, in both which places very great weights are conſtantly lifted, render the expenſe of Hempen Ropes very burthenſome; as in the firſt inſtance, ſuch Ropes being ſoon rotted by the wet; and in the other, the texture deſtroyed by the heat they are expoſed to, the Limbs and Lives of the Workmen are conſtantly ſubjected to imminent danger, which it is hoped the uſe of Metal may effectually guard againſt.

The advantages that would ariſe from the obtaining a better Machine for raiſing Water, and a more convenient method of extinguiſhing Fires, than any now known or practiſed, are obvious;

and the Society have this year offered rewards for ſuch diſcoveries.

In Colonies and Trade.

The obtaining, for the Weſt India Iſlands, that excellent plant, the Bread Fruit Tree, has long been conſidered as a ſubject of the firſt importance to thoſe Iſlands, and Premiums have been offered, hitherto without ſucceſs, for bringing ſome of the trees to England, in order to their being forwarded to the Weſt Indies; but as it now ſeems probable that ſome of the Veſſels lately ſent to the South Seas, will convey thoſe Plants immediately to his Majeſty's Settlements in the Weſt Indies, the Society, to co-operate in ſo deſirable a meaſure, and reward as much as in them lies, ſo laudable an attempt, have this year changed the conditions of their Premium, and offered it

for

for the immediate conveyance of the Plants from the South Sea to the Iſlands of the Atlantic Ocean.

The great uſes of the Gum Senegal, in Calicoe Printing, and the high price that Gum is frequently ſold at, renders any Succedaneum a valuable acquiſition; and as from ſome trials the Gum of the Caſhew-tree, which grows luxuriantly in Jamaica, and the other Weſt India Iſlands, has been found to anſwer the purpoſe of the Gum Senegal, a Premium has been offered, this year, for importing ſuch a quantity as may eſtabliſh its character among the Manufacturers, and aſſure a profit to the Grower, on his ſending it to this Country.

It may not be here improper to congratulate the Publick, on the full eſtabliſhment of a Manufacture, in this

Directions to the Bookbinder.

Place the Plate of Mr Matthew Hill's Machine for meaſuring Angles to face page 183.

The Plate of Mr Ridley's Sector depthning Tool to face page 188.

The Plate of Mr Ridley's improved Sector to face page 196.

The Plate of Mr Beſant's explanation of his Carriage to face page 203.

The Plate of Mr Beſant's Carriage to face page 209.

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ERRATA.

Page 59. line 6. for *Vegi-* read *Vege-*

61. 2. and page 63 line 10 for *embarkment* read *embankment*

73. last but one, after *attending*, insert *it*

139. 8. for *ſugar lead*, read *ſugar of lead*

331. 1. for *aavantage*, read *advantage*

PAPERS

IN

AGRICULTURE.

AGRICULTURE.

IT muſt be highly ſatisfactory to every lover of his country, to obſerve the various improvements, daily ariſing in that uſeful branch of Agriculture, the cultivating the growth of Timber in theſe iſlands; and the Society contemplate with great pleaſure, the accounts they receive of large plantations making among the more uncultivated parts of the kingdom; whereby, not only the beauty of the land is highly encreaſed, and the induſtrious labourer employed: but a foundation laid for future population in thoſe parts, where the want of wood for the neceſſary purpoſes of building and fewel, have rendered it impoſſible for men to eſtabliſh themſelves in large bodies, and conſequently

an appearance of want and desolation, has spread itself over the country; this to a humane mind would seem a sufficient inducement to the planting the wastes and hitherto unimproved moors, over the whole island; but when it is considered what pecuniary advantages will, in time, arise to the proprietors of such lands, it is surprising so many acres are to be found in this kingdom in the state they now appear.

It will be evident from the following papers, that the Earl of Fife, has set a laudable example to his neighbours in this instance, and the Society, fully sensible of the advantages of such improvements, returned their thanks to his Lordship for the communication, and presented their Gold medal to him, as a mark of their approbation of his Lordship's spirited and well directed exertions in so extensive an undertaking.

Duff-

Duff Houſe, Dec. 9, 1787.

SIR,

I Have ſent under another cover, a letter containing a ſtate of my plantations; which you will be ſo good as preſent to the Society. I have only to add, that moſt of my plantations in the counties of Aberdeen, and Banff, and ſome in Moray, are incloſed with ſtone fences, of a proper height coped with two turfs; there are no ſtones in moſt of the moors in the county of Moray, many of the turf fences, are above twenty years old, and as good as when they were built, I am with great reſpect,

Sir,

Your moſt obedient,

humble Servant,

Mr. MORE.

FIFE.

Duff Houſe, Dec. 9, 1787.

SIR,

I Am induced to trouble you with the following account of my plantations, in this diſtant part of the kingdom, from an hope that it may lead others to purſue the ſame meaſures which I have adopted; in order to cover waſte lands, and barren moors, and to render them, however incapable they may appear of cultivation, at once conducive to utility and beauty. There has been for ſome years, a great deſire in this country, for promoting Agriculture, and Manufactories; the great drawback is the expence of fire, and want of timber. Coals are brought by ſea at great expence of freight, and what is ſtill more grievous, a heavy and unjuſt tax on it; for thoſe who are at the greateſt diſtance from the coal pit, pay a higher tax

than

than thoſe that are nearer to it; in many places there is no peat or turf, and that wretched fire, coſts more expenſe in loſs of time than it is worth.

My great inducement to promote extenſive plantations, was to aid Agriculture and Manufactories, and to ornament and beautify the country.

It is now above thirty years ſince my plantations commenced, and from their infancy to the preſent period, I have nurſed them with care, regularity, and perſeverance; every ſucceeding year has enlarged the old, or has given birth to a new planted encloſure; by theſe means, about ſeven thouſand acres of bleak and inhoſpitable moors, have been cloathed with riſing and flouriſhing trees, in Aberdeenſhire, Banffſhire, and in Moray.

My experience, I ſhould hope, has in ſome degree kept pace with the extenſion of my plantations, every publication on the ſubject naturally attracted my attention; but my knowledge has been principally founded on my obſervations of the different ſoils, and of the various ſituations in which I have tried experiments with almoſt every ſpecies of foreſt trees; ſhould my wiſhes of communicating information, or of inſpiring emulation be anſwered, I ſhall moſt willingly embrace every opportunity of laying before the Society a full and accurate account of my proceedings.

I began firſt at this place to incloſe my Park, it is in the county of Banff, there were many natural beauties from ſea-views, a fine river, much variety from inequality of ground, and fine rock ſcenes in different parts of the river: there was

not

not a tree when I began, and it was generally believed no wood would thrive ſo near the ſea coaſt; I have proved that to be a miſtake, my Park is about fourteen miles round. I have every kind of foreſt trees, from thirty years old, in a moſt thriving ſtate, and few places better wooded: this is an encouragement to thoſe who love planting, where the climate is more favourable.

I ſhall not trouble the Society with any account of what I have done for the ornament and decoration of my grounds, as that, although it employs many poor labourers, may be conſidered as foppiſh dreſs, and changeable like other faſhionable cloathing, but ſhall proceed to lay before them, a narrative of the methods which I have adopted in planting barren moors, and lands waſte and uncultivated.

I encloſe the Moor, by an earth dyke of turf five feet high, four feet wide at the foundation, and twenty two inches at top, at four ſhillings for every Scotch chain of twenty four ells.

I plant in every acre about twelve hundred trees; I uſed to plant above three thouſand, but by experience, I find it better not to plant them ſo thick, but make them up if neceſſary the third year, eſpecially in my Plantations in the county of Moray, where ſcarcely a tree planted ever fails; the greateſt number are Scotch Firs, they are tranſplanted from the ſeed beds the third year: I purchaſe them at tenpence the thouſand, I only conſider them as nurſes to my other trees, for they are regularly cut out, when they have done their duty as nurſes, and they are profitable for fire and uſeful in agriculture. I plant every other ſpecies of

foreſt

foreſt trees intermixed with the firs. I order different pieces of the Moor to be trenched where the ſoil is beſt and moſt ſheltered, and lay a little lime and ſome dung on it: in thoſe places, I ſow ſeeds of trees for nurſery.

I alſo plant, in beds, year old different trees taken from my other Nurſeries; I nurſe them for three years, and then plant them all over my Plantations: this I find very beneficial, as they are raiſed in the ſame ſoil.

When I am filling up the Plantation, the firs are then for the firſt time cut down, or they are tranſplanted, being raiſed with balls of earth, when the Moor is wet with rain, which is very eaſily done, and they are carried to incloſures of ten or twelve acres, and where from a deſire to forward woods, I am planting trees more advanced;

advanced: they are planted in pits about forty feet diſtance, and ſeldom or ever fail, and anſwer a ſecond time as nurſes.

In different parts of my eſtate, I have alſo planted belts by the ſide of the high roads, about twenty feet in width, and ſmall plantations of two or three acres; theſe are extended round different farms, and are filled with Aſh, Oak, Elm, Beech, Sycamore, and other foreſt trees, about fifteen feet high; in theſe ſpots, which are trenched, and regularly hoed twice a year, they remain three years, then the half, or two thirds of them, where they ſtand two cloſely, are removed to open places, cut in the Fir plantations, where they are planted at proper diſtances, about thirty or forty feet, and are ſheltered from the wind: this ſcheme has very rarely failed; and I have obſerved with great

pleaſure

pleaſure and ſatisfaction, that by the regularity of my methods, by my unabated zeal, and unremitted care, ſome of my plantations appear to have made a more rapid progreſs, in ten years, than thoſe in other ſituations have in twenty.

My firſt care, after the incloſure is properly filled up, is to guard againſt any injury from cattle; a ſmall allowance given to a few labourers anſwers that purpoſe, if the fences are properly executed, they require very little repair; after the plantation is filled up, the moſt regular and neceſſary attention muſt be had to the weeding of it, and this is carried on over my plantations, of all ages, in the moſt exact manner.

I make roads through all the plantations, which are carried forward according to the ſituation, never in a ſtraight line, ſo as

as to draw violent winds; and thoſe roads go to all the parts of the plantations, they make agreeable rides through fine woods, formerly a bleak moor, and anſwer not only for filling them up, but alſo for carrying away the neceſſary weedings; the value and proſperity of the woods, depending as I obſerved before, on the unremitted attention in weeding it.

I begin to plant in October, and continue till April; if the weather is froſty and not fit for planting, all the people are employed in weeding the woods.

My great plantations for the laſt eighteen years has been near Innes-houſe, in the county of Moray, and for your more particular information, I convey to you along with this, an account of my plantations there, ſince the firſt of February 1784, and continued down to the laſt of March,

March, 1787, atteſted, and ſigned by my planter.

I am too well convinced, of the anxious and zealous diſpoſition of the Society, to promote and liſten to improvements in planting, and Agriculture, to imagine that any apology is neceſſary for the length of this letter; nor have I been deterred from writing, by the diſtance of this place from the capital, as I am ſenſible how much it is their wiſh, that the advancement of the Arts, ſhould be diſſemminated through every part of the kingdom.

I am with great reſpect, Sir,

Your moſt obedient

humble Servant,

FIFE.

Mr. MORE.

Plantations

Plantations of the EARL of FIFE, about Innes, &c. in the County of Moray, planted ſince the firſt of February 1784, and continued down to the laſt of March, 1787. The names of which are as follows; with the number of acres contained in each plantation, and the ells of dykes.

	Acres.	Ells of Dyke
Bin Hill of Spey	520	6114
King's Road ſide	5	718
North the Glebe	5½	644
Moſs towie	14	1944
Bridge of Darkland	5	586
	549½	10006

The above five hundred and forty nine and a half acres, are planted with the following trees, at about one thouſand two hundred and thirty to the Acre, and are as follows

Sycamore

Sycamore	8000
Common Firs	266600
Oaks	65160
Beech	64306
Larch	50000
Birch	100000
Poplar	10000
Alder	12000
Willows	8000
Mountain Aſh	29500
Laburnum	6000
Elms	12000
Aſh	12000
Hazle	6000
Spruce Fir	5000
Sweet Cheſnuts	22000
	676566

The above Plantations, are well ſecured from cattle, and the trees in a moſt thriving ſtate at preſent.

Beſides the above incloſures, there are on the Farm of Darkland, one thouſand ſeven hundred and eighteen ells, of a hedge and belt; and on the Farm of Forreſterſeat, one thouſand five hundred and two ells; likewiſe from the mains of Innes, to the church of Urquhart, one thouſand five hundred and twenty-ſix ells: The above hedges and trees all kept clean and in a very thriving ſtate at preſent.

JAMES GEORGE.

There are beſides what is ſtated above, about ſixty thouſand Firs, and one hundred thouſand Oaks, Birch, Aſh, Larch, and other Foreſt trees, planted ſince February, 1784, in the Plantations in the Counties of Aberdeen, and Banff, all in a thriving ſtate.

Innes Houſe,
December 7, 1787.

The

The Society after having voted their Gold Medal to the Earl of Fife, requeſted his Lordſhip to favour them with an account of the preſent ſtate and condition of all his Plantations made more than fifteen years ago; ſpecifying the nature of the ſoil, what ſpecies of timber thrives beſt, the ſizes of the different kinds of trees, and what uſes have been made of thoſe trees already cut out; but particularly whether the ſaid Plantations are intended ſolely for the purpoſe of raiſing timber, or as is the general practice in England, for raiſing timber and underwood.

In conſequence of the foregoing requeſt, his Lordſhip obliged the Society with the following Letter and particulars of his ſeveral Plantations.

Whitehall, Feb. 9, 1788.

SIR,

I Wiſhed to have returned an anſwer ſooner to the Society, but I have been prevented by the length of time neceſſary for ſending to the country: I have now procured the dimenſions of the different trees in my Plantations, which were made above fifteen years ago, with as particular an account of the nature of the ſoil as can be given, which over ſo very large an extent of ground, muſt of courſe be very different.

The report is incloſed, if it ſhould appear tedious, I hope to be excuſed, as it proceeds from a deſire to give the moſt particular information.—It is my cuſtom every year to review the fences, and ride or walk over every part of the Plantations.

And

And ſo anxious am I to raiſe timber, that I have myſelf written in the rentual books of the different eſtates, a memorial, requeſting my ſucceſſors to attend to keeping the fences in repair, and never to allow cattle at any time to get into the woods, as upon their conſtant attention to this particular, will depend the value of the trees.

As my great deſire is to raiſe the woods for the purpoſe of timber, I never cut a tree when it can be tranſplanted into any other Plantation; the trees therefore that are cut, are always the worſt, and are removed in order to give room for a more valuable neighbour to proſper Hence I cannot expect the profit from the weedings to be very conſiderable; there muſt however, from ſuch extenſive Plantations, be a great many trees cut down. I do as much as poſſible direct theſe re-

movals myſelf, or when that cannot be done, I truſt it to thoſe who have planted the trees, who know fully my wiſhes, and who, if they merit any cenſure, are rather too ſparing of the axe. A diſtinct book is regularly kept for every ſeparate Plantation; the weedings are ſold by auction at thoſe periods which are known to be moſt convenient for the country people: theſe cautions prevent cheating, and ſhews the exact profit which every year produces. I think the weedings were ſold laſt year for about one hundred and fifty pounds; and every year, in all human probability, the advantage muſt increaſe. The firs anſwer for farm-houſes, and paling for fences, the aſh, oak, elm, beech, &c. anſwer for the different uſes in huſbandry, ſuch as carts, ploughs, harrows, and barrows.

The underwood is raiſed for cover and for beauty, beſides which, it alſo anſwers

for

for firing; I wiſh it however to be underſtood, that the underwood never is allowed to interfere with the grand and leading object the raiſing of timber. The Society alſo will pleaſe to obſerve, that all the trees, except the Firs, are planted at ſuch diſtances, as never to require tranſplantation, and if any of them fail, new trees immediately ſupply the vacancies.

The Firs therefore are the only trees, which are allowed to be cut down in the great Plantations, which have been raiſed during this laſt twenty years.

I have the honour to be with the greateſt reſpect, Sir,

Your moſt obedient

humble ſervant,

FIFE.

SAM. MORE, Eſq.

REPORT

with respect to the Size &c. of the

TIMBER

IN THE

PLANTATIONS,

NEAR

DUFF HOUSE,

BELONGING TO THE

EARL of FIFE.

I Have measured some of the Forest Trees in different parts of the plantations planted about twenty-five years ago, the circumference taken at three feet from the root, and they are as follows,

Loam

		Length of the Trunk	Height	Circumference
		Feet	Feet	Feet Inches
Loam and clay bottom	Oaks	12	25 to 30	2 $9\frac{1}{2}$
Light black earth	Elm	18	30 35	5 4
Heavy wet ground	Ash	20	35 40	3 9
Dry fandy foil	Beech	14	30 35	3 0
Good heavy Loom	Larch		46	6 3
	Silver Fir		$44\frac{1}{2}$	6 8

Oak

Oak ſells here from two to three ſhillings per ſolid foot; Aſh, and Elm, from one ſhilling and eightpence, to two ſhillings; Beech from one ſhilling to eighteenpence, and fullgrown Fir, from eight to tenpence: but in Lord Fife's Plantations, the worſt trees are only thined out for the benefit of what is left, and theſe are ſold by the piece; the Aſh and Elm, for labouring untenſils, from ten to twenty ſhillings, and the Firs, for roofs and rails, from three to ten ſhillings, the branches and ſmall weedings are uſed for fire wood.

The Plantations in this neighbourhood, are now all thined for this ſeaſon, and in general in a moſt thriving ſtate.

Underwood is only promoted with a view to the thriving of the Timber, which is Lord Fife's principal object.

JOHN GEDDES, Planter.

Duff Houſe,
Jan. 25, 1788.

N. B.

N. B. There are large Plantations at Duff Houſe, that for many years were kept trenched, in which are very few Firs, the weedings now become valuable.

FIFE.

PLAN-

PLANTATIONS of the EARL of FIFE, about INNES, &c. in the County of MORAY, the names of which are as follow, with the dates of their being planted, the number of Acres, in each Plantation, and Ells of Dykes.

		Acres	Ells of Dyke
1769.	Braiks Hill	10	960
	Horn Head and Thorney Crook	6	740
1770.	Clumps in the Greens	9	908
1771.	Belts in do.	2	480
	Cloggans	8	856
	Tile Hill Shirriff town	4½	575
	Little Ruther	6	946
	Loch Hill	36	2032
1772.	Burn side of Whinny-hall	3	720
	Black Hillock	3	540
	Carried over	87½	8757

Tide

		Acres	Ells of Dyke
Brought over		87½	8757
1772.	Tide Hill Barn yard	4	608
	Lochnabo	439	5640
	Rutherhill	18	1128
1773.	Elgins Hill	15¼	1030
	Belt at Barnyards	2¼	2270
	Belts at Elgin road ſide	1½	1520
	March Avenue	3	632
1774.	Belts in the Greens	2	720
	Crooked Wood	32	1445
		604½	23750

The above ſix hundred and four acres and a half, are planted with the following trees, at about three thouſand to the acre; the different trees meaſured, were planted in the years 1769 and 1770.

Common

	Number of Trees	Inches of Girth	Feet High
Common Firs	1660000	27	31
Larch	28500	58	30
Oak	28500	23	21
Birch	28500	29	22
Mountain Aſh	28000	33	24
Alder	8000	29	26
Elm	4000	38	27
Aſh	5000	34	27
Willows	2000	40	26
Sycamore	2000	28	23
Hazle	3000		
Sweet Cheſnut	5000	29	18
Labernum	5000		
Silver Fir	4000	28	27
Beech	25000	25	20
	1836500		

All the above Plantations are in a moſt thriving ſtate at preſent, and well fenced

fenced from cattle, and the weedings and underwood, only promoted with a view to forward, and not to injure the thriving timber, which is Lord Fife's principal object, and there is no tree cut for profit, but only for the benefit and relief of thoſe left, and the worſt always cut.

When the above Plantations were planted, it was the practice to plant thick, but they have been regularly weeded ſo as the branches never touch one another; there are never any weeded or cut out but Firs, the firſt weedings of which were not good for any thing but firewood; but what are now cut or weeded ſerve for many purpoſes in the country, and ſell at twopence ſterling each, and their girths and heights are as in the foregoing tables, two feet above ground.

The

The ſoil in general is a light yellow mixture, and when it comes to any depth, it has a loamy bottom; ſeldom or ever any of the above trees fail.

JAMES GEORGE.

PLANTA-

PLANTATIONS of the EARL of FIFE, about INNES HOUSE, in the County of MORAY, planted in the following Years, with their names, number of Acres, and Ells of Dyke, &c. extracted from the planting Book.

		Acres	Ells of Dyke
1775.	Folds	5	625
	Moſs ſide of Meſt	3½	500
	Finfan	21	1224
1776.	Corſkie Moor	16½	1058
	Parks of Loch Hill Belt and Hedge		2002
	Hedges of Barnyards		2000
1777.	Hedge at Moſstodlich		1262
	Belts at the Milburn	3	1892
	Fernfield	11	900
	Morriſton	6	555
	Belt at Slentack	½	510
	Carried over	66½	12528

		Acres.	Ells of Dyke
Brought over		66½	12528
	Belt at Shearſton	4	1132
	Belt at Andrew Downies		168
1778.	Loan Hilloch	¾	198
	Muiryhall	4¼	552
	Saughen Avenue	1	803
	Back Belt in the Greens	1½	678
		78	16059

The above ſeventy-eight acres are planted with the following trees, at three thouſand to the acre.

Common Firs	295000
Larch	5000
Oak	5000
Birch	5000
Carried over	310000

Brought

Brought over		310000
	Mountain Aſh	5000
	Beech	5000
	Alder	1500
	Elm	2000
	Aſh	2000
	Willows	2000
	Sycamore	2000
	Hazle	2000
	Sweet Cheſnut	2000
	Laburnum	2000
		335500

The above Plantations are regularly thined and well fenced from cattle, and are in a moſt thriving ſtate at preſent.

Planted in the followiug years.

		Acres	Ells of Dyke
1779.	Eaſt Moors of Urquhart	670	5231
1780.	Weſt ſide of the crooked Wood	36	1196
	Galſlodge	1½	302
1781.	South Moors of Urquhart	680	4970
1782.	Quarrie Wood	350	3350
	Little oak Wood and Sherrif Miln	22	1860
1783.	Sanchrie and North the Glebe	22	1932
		1781½	18841

The above one thouſand ſeven hundred and eighty one acres and a half, are planted with the following trees, at one thouſand two hundred and thirty to the acre.

Common

Common Firs	1476820
Larch	98313
Oak	98313
Birch	98313
Mountain Aſh	98313
Beech	98313
Alder	10000
Elm	37600
Aſh	38500
Willows	3000
Sycamore	38000
Hazle	36200
Sweet Cheſnut	35100
Laburnum	38100
Spruce Fir	5000
Silver Fir	6500
	2216385

All the above Plantations are well ſecured from cattle, and are in a very thriving ſtate at preſent.

JAMES GEORGE.

The Reverend J. R. Lloyd, of Aſton, near Oſweſtry, Salop, having requeſted a copy of the premiums offered for planting Oaks, and the ſame being accordingly ſent to him, the following Letter and Certificate were received by the Society; and the Gold Medal adjudged to Mr. Lloyd, for having cauſed the Plantation to be made; after which the Letter dated December 19, 1787, was ſent by him, giving ſome further account of the methods purſued in forming the ſaid Plantation; and as it appears that a conſiderable quantity of Acorns was ſown among the planted Oaks, it is hoped due attention will be paid to the growth of all the trees, that the queſtion, long agitated among cultivators of Wood, *Whether it is beſt to raiſe Oaks immediately from the Acorns, in the ſpot they are to remain on, or to*

tranſplant

tranſplant them from Nurſeries? may be decided, which Mr. Lloyd's experiment ſeems to afford a very convenient opportunity of doing.

SIR,

I Return you my beſt thanks for your polite attention to my letter, and have ſent you the certificates required; you will obſerve that the cover is directed by the ſame perſon that has examined the Plantation, for I thought it would be more ſatisfactory to have the circumſtances atteſted by a neighbour, that might be known as being in the public capacity of member for the county.

I confeſs my method of planting does not exactly coinſide with the article you tranſcribed; I have no ground of that ſort upon my eſtate, therefore apprehend that a field ſo ſituated, as to render improvement in Agriculture very expenſive and

difficult upon it, might be highly proper for the purpoſe I put it to, the cultivation of Oaks, eſpecially as the ſoil has been found extremely favourable to that kind of tree. Should any further account be neceſſary, you will oblige me by favouring me with a line, and it ſhall be immediately tranſmitted by,

Sir, your obliged

and obedient humble ſervant,

J. R. Lloyd.

Aſton (near Oſweſtry)
Nov. 17, 1787.

P. S. Mr. Davies, a neighbouring clergyman, and very reſpectable man, has done me the favour likewiſe to ſign the certificate.

Mr. More.

I hereby certify, that in the autumn of the year 1784, by order of the Reverend J. R. Lloyd, of Aſton, in the County of Salop, I planted ſixty-five thouſand four hundred and forty Oaks, of three and four years old, in a field belonging to the ſaid J. R. Lloyd, well fenced and ſecured from cattle, &c. and in ſize fifteen acres and three quarters; that the following autumn, I went over the ſaid Oaks, and ſowed an acorn by every ſickly plant, and further put down acorns within the Plantation, in different places, to the quantity of near ten buſhels: and I further certify, that the whole is now in a flouriſhing ſtate, and likely to become a fine wood, as witneſs my hand this 15th day of November 1787,

EDWARD WILLIAMS,

Late Gardener to the Rev. J. R. Lloyd.

I hereby certify that about ſix weeks ſince, I examined the above-mentioned Plantation of Oaks, belonging to the Rev. J. R. Lloyd, and believe the whole to be in a flouriſhing ſtate, as are likewiſe the plants which have grown from the acorns; that the whole is well fenced and ſecured from cattle, &c. and has been kept totally free from any treſpaſs, as far as I can perceive, and moreover that the ſaid Plantation is likely to become a fine wood; as witneſs my hand, this 15th day of November 1787.

J. FAYEL.

Preſent Gardener to the Rev. J. R. Lloyd.

The Certificates of the within mentioned Edward Williams, and James Fayel, were teſtified upon oath before me John Kynaſton, one of his Majeſty's Juſtices of the Peace for the County of Salop, this 15th day

day of November 1787. And having myſelf carefully examined the ſaid Plantation am fully ſatisfied of the truth of the ſaid certificates: given under my hand the day and year above written.

JOHN KYNASTON.

I hereby certify that the Plantation before-mentioned is well fenced, and has been kept ſo from the firſt of the trees being put down, and alſo that the whole is in a flouriſhing ſtate; as witneſs my hand this 17th day of November 1787.

W. DAVIES,

Vicar of St Martins in the County of Salop.

Aſton,

Aſton, December 19, 1787.

SIR,

WHEN I laſt had the pleaſure of ſeeing you in town, you deſired to have ſome account how my plantation of Oaks was made, which I ſhall endeavour to give, though I believe there will be found in it little or no deviation from the common method.

Some years ſince, I procured large quantities of Acorns from uncommonly fine Oaks in this neighbourhood, and immediately ſowed them in drills in my nurſery: I had them well cleaned the following ſpring when they came up, and the ground between the rows kept conſtantly free from weeds, while they remained in that place. The field where the Oaks now are, meaſures fifteen acres three rood, the ſoil ſhallow, upon a clay bottom mixed with ſtones, which previous

vious to its receiving the trees had undergone a regular courſe of tillage.

The Oaks, in number ſixty-five thouſand four hundred and forty, were planted in autumn, for each of which a hole was cut with a ſpade, and care taken to prevent the tap root being injured. The following autumn, an acorn was ſet near every ſickly tree, and a quantity diſperſed over the plantation to the amount of near ten buſhels in all: the whole has been kept regularly well fenced, and protected from cattle and treſpaſs of any kind; and as Oaks grow remarkably well in the neighbouring fields, in exactly ſimilar land, I may with ſome degree of reaſon conclude, that my plantation will be attended with ſucceſs.

I am Sir,

Your moſt obedient,

humble ſervant

Mr. More. J. R. Lloyd.

In the fifth Volume of theſe Tranſactions, a full account is inſerted of the large Plantation at Butsfield, belonging to THOMAS WHITE, Eſq; and this year the following Letter and Certificate of the planting fifty thouſand Oaks, on that eſtate being received, the Silver Medal was adjudged to Mr. White, on whom many honorary rewards have been already beſtowed for his attention to the views of this inſtitution, by cauſing ſuch extenſive and uſeful improvements to be made, and thereby ſetting a laudable example before his neighbours, who may be poſſeſſed of uncultivated, and unprofitable lands, in the northern parts of England.

I JOHN WEST, do hereby certify the having planted upon the eſtate of my maſter, Thomas White, Eſq. at Butsfield plantations, in the pariſh of Lancheſter, and county of Durham, fifty thouſand Oak Trees, fine healthy plants, which were previouſly raiſed and properly tranſplanted in a nurſery, the ſame being planted amongſt other trees over a conſiderable tract of ground at ſufficient diſtances to make timber, and properly fenced with a very ſubſtantial ſtone wall, and the buſineſs was performed between the fifth of February, and the fourteenth of March 1787, which plants are now in a very healthy and thriving condition; as witneſs my hand at Butsfield plantation, May the 12th, 1787.

JOHN WEST.

Planter for THOMAS WHITE, Eſq.

May

May 12, 1787.

I hereby certify that I ſeveral times viſited and inſpected Mr. White's Plantations, during the planting of the fifty thouſand Oak Plants, as above ſpecified, and I have every reaſon to believe that the above account is true, as witneſs my hand.

ROBERT DENT,
Curate of Lancheſter.

SIR,

BY the order of my maſter Mr. White, I have made bold to acquaint you for the inſpection of the Society, that after diligent ſearch amongſt the Oaks by me this year here planted, and previouſly certified for, that I have not been able to find twenty failing plants in the whole quantity, and they are more vigorous than any I ever before ſaw in the year wherein they

they were planted, the cauſe of which may chiefly be attributed to the wetneſs of the ſeaſon, which has cauſed this infant, though extenſive Plantation, to grow with more rapidity than in any foregoing year,

I remain for Thomas White, Eſq.

Sir,

Your moſt obedient,

humble Servant,

JOHN WEST.

Butsfield Plantation, near Durham, Aug. 16, 1787.

Mr. MORE.

It appears by the Society's Books, that three Gold Medals, and a pecuniary premium of thirty pounds, have been already beſtowed for planting Larch, and giving an account of the utility of the wood; and as the cultivation of that beautiful and uſeful tree, is extending itſelf much in many parts of the Kingdom, it is judged proper to ſubmit to the public, the following Extracts of Letters received from very diſtant parts of Europe, by which it will appear, that in the very different Climates of Venice and Archangel, the Larch has beenapplied to the conſtruction of Ships.—The advantages that may acrue to this Country, from this information, time only can render certain; but as the Larch is a tree of quick growth, and the wood of a firm and durable texture, it is not unlikely it may on trial, be found well

adapted

adapted to many uſeful purpoſes in the conſtructing of the ſmaller kind of Veſſels, an object, it is preſumed of very conſiderable conſequence to the Mercantile Intereſt of theſe Kingdoms.

Extract of a LETTER from FRANCIS DENNISON, Esq. to Mr ALEXANDER SMALL, dated PETERSBURG, November 13, 1787.

DEAR SIR,

THIS is to acknowledge the receipt of the Letter you favoured me with ſome time ago, which my being out of the way prevented my anſwering before. The Larch, in this Country, is applied to no other purpoſe than that of Ship Building, to which uſe it anſwers perfectly well: Line of Battle Ships, are built of it in Archangel, which gene-

rally laſt fifteen years; but in milder Climates, no doubt, would laſt much longer. I wiſh you may ſucceed in growing this wood in England, as it would undoubtedly be of great utility: ſhould I have it in my power to give you any further intelligence in this particular, you may command me, and ſhall think myſelf highly favoured by your confidence.

In that excellent work, entitled Travels into Poland, Ruſſia, Sweden, and Denmark, interſperſed with hiſtorical relations and political enquiries, illuſtrated with charts and engravings, by Wm. Coxe, A. M. F. R. S. Fellow of King's College, Cambridge, and Chaplain to his Grace the Duke of Marlborough, in two volumes, quarto; vol. II. page 227, it is ſaid, "Ruſſia produces every arti-
"cle neceſſary for the conſtruction and
"equipment

" equipment of ſhips, which are chief-
" ly built at Cronſted, Peterſburg, and
" Archangel; thoſe conſtructed at Cron-
" ſted and Peterſburg, are framed with
" Oak; while thoſe from Archangel, are
" made with Larch-wood; the latter
" are much leſs adapted than the for-
" mer for an engagement. For the ſup-
" ply of the Dockyards at Peterſburg,
" and Cronſted, the Oak is ſent from
" the Province of Cuſan."

Extract of a LETTER, dated VENICE, May 23, 1787, from Mr RICHIE, his Majeſty's Chargé des Affairs there, to Mr STRANGE, &c. in anſwer to the query about the Larix.

HAving informed myſelf about the LARIX, which grows plentifully in the mountains of Friuli, and in many places of Dalmatia, I find it is ſome-

times employed in ſhip building, eſpecially in the lighteſt parts of the upper works, but not where maſſy pieces of timber are required, on account of its extraordinary weight, though where that makes no objection it may ſerve very well in almoſt any part of the conſtruction: It reſiſts the intemperature of the air, more than any wood known in this Country, and therefore it is much uſed in making outer Gates, Pales, and all other works which are conſtantly expoſed to the open air. It is no leſs durable within doors, and in ſome of the very old Palaces here, there are beams of Larix as ſound as when firſt placed. In a word, wherever ſtrength and durability are required, this is reckoned here the moſt choice wood they have, and may be applied to a great number of uſes. At Venice, they have great plenty

of

of good Oak, and there being too little water on the bar, for large ſhips, excepting at ſpring tides, they are obliged to ſtudy lightneſs in the conſtruction of their ſhips, rather than ſtrength or duration, which not being the caſe generally in England, the Venetian practice, is not to be taken as a rule, but trial and experience muſt determine.

Gaining LAND from the SEA, has for ſome Years paſt been an object of the attention of the Society, and in the Year 1785, the Gold Medal was adjudged to Mr. JOHN HARRIOT, of Rochford, in Eſſex. See Vol. IV. Page 44.

This Year the following Account, with Certificates were ſent, but not being produced in due time, the Society could not conſiſtently with their Rules and Orders, adjudge the Gold Medal, which was the Premium offered, to this Candidate; yet in conſideration of the merit of the Work, the Silver Medal was voted to the Rev. HENRY BATE DUDLEY, from whom the papers were received.

Brad-

Bradwell Lodge, Eſſex, Octr. 4, 1787.

SIR,

I Requeſt that you will do me the favour to lay before the Society inſtituted for the Encouragement of Arts, Manufactures, and Commerce, the following ſtatement of the means I purſued in obtaining a certain tract of land from the Sea, in the Pariſh of Bradwell, juxta mare, in the county of Eſſex.

On coming to poſſeſſion (in 1781,) of the Glebe of the ſaid Pariſh, containing between three and four hundred acres, I found it in a deplorable ſtate of cultivation; the principal part of it being marſh land, bounded on the ſouthward by the German ocean, was ſo much impoveriſhed by ſpring, and autumnal landfloods, that the tenant was obliged to quit

quit the eſtate from inability to pay his rent.

Taking the Farm into my own hands, I ſoon perceived that good draining was the principal thing requiſite to bring the land into a proper ſtate of cultivation: I therefore ſet about widening and deepening all the marſh ditches, the ſtuff from which, with the old banks, which had probably remained unmoleſted for centuries, I carried into the middle of the lands, at not leſs than one hundred loads per acre.

After four years perſeverance, with a conſiderable ſtrength of men and horſes, I ſaw that all my endeavours would fall ſhort of the effectual improvement I propoſed, unleſs ſome method could be deviſed of carrying the land-floods more rapidly to ſea.

The

The ditches now made, in general ſixteen feet wide, and ſix deep, retained a vaſt body of water, the ſurface of which being nearly equal with that of the earth, kept the land in a conſtant ſtate of moiſture prejudicial to every ſpecies of Vegitation. I now diſcovered the cauſe of all the miſchief which my neighbours, as well as my own lands, had ſo long experienced. I found that the land in front of my ſea-wall, to the ſouthward (called ſaltings, from the ſea overflowing it except at low water) was grown higher than the marſh land within the wall; that the channels from the two ſea ſluices, dividing mine and the adjoining eſtates, to my right and left, were nothing more than the narrow irregular courſes, which the ebbing tide had marked, and therefore liable to be choaked up with the ſea-weed every north eaſt wind. And that even the ſluices themſelves were ſo ill contrived

trived and out of repair, as more frequently to admit the ſalt, than let out the freſh water.

It now occurred to me, that the only effectual means of curing the evil, would be to take the ſaltings in from the ſea, at the depth of fifty-ſix rods, and length of one hundred and twenty-ſeven, putting down more capacious ſluices at each angle of the advanced wall—cutting ſtraight channels through the new land to the ſluices, and making outfall courſes equally ſtraight and ſpacious, to convey the freſhes from the ſluices to the ſea.

Having laid my plan before the proprietors of the adjoining eſtates, they were ſoon convinced of its general utility, and liberally granted me two or three angles of their ſaltings, without which the work would not have been complete.

The

The annexed Certificate ſtates the particulars of the embarkment; to which it may be neceſſary to add, that the foreland, the part ſet off from the front of the wall, from which no earth is ſuffered to be dug into the work, as it would weaken the wall, is twenty-one feet wide; that the ſeating (between the inſide of the wall, and the delph or ditch for back water, for the ſame ſecurity, is eighteen feet. And that the whole work was compleated by eight men, with barrows and ſhovels only, in a few days over ſix months time.

Whether the improvement in Agriculture which I have thus related to you, Sir, will entitle me to the honorary reward of your Society, I know not; but be that as it may, I ſhall derive great ſatisfaction from having been enabled to lay before the members of ſo laudable an inſtitution,

an

an experiment which I flatter myſelf has proved ſerviceable to the country in which I reſide.

I have the honour to be with great reſpect,

Sir, your moſt obedient

humble Servant,

H. BATE DUDLEY.

MR. MORE.

Brad-

Bradwell, near the Sea, Eſſex, Sep. 29, 1787.

WE the underwritten, the Miniſter, Church Warden, and Overſeers of the Pariſh aforeſaid, do hereby certify, that between the Months of March and September 1786, the Rev. HENRY BATE DUDLEY, of Bradwell Lodge, did ſecurely encloſe in the ſaid pariſh of Bradwell, near the Sea, in the County of Eſſex, by an embarkment of ſoil only, a tract of land meaſuring forty-five acres, one rood, and twenty-five poles; which land, until ſuch encloſure, had been time immemorial overflowed by the ſea from the German ocean.

That the ſea-wall, now encloſing this recovered land, contains in length one hundred and eighty three poles; that its baſe is thirty-two feet, its height ſeven feet, and the top five feet wide. That it is the general opinion, the land ſo gained

is

is worth twenty ſhillings per acre, on a leaſe of twenty-one years.

That this work has greatly benefited and improved the whole level of marſhes, in the ſaid pariſh, as well as the adjoining one, by the conſtruction and poſition of the ſea-gutters or ſluices, in the ſaid ſea-wall, which are placed at the extreme end of the new-gained land next the ſea, whereby the freſh water is now carried to ſea with great facility, and the country no longer ſubject to thoſe inundations, which till this improvement, it always experienced at certain rainy ſeaſons. And we further certify, that to the beſt of our knowledge and belief, the whole of this improvement was effected at the following rates.

	£.	s.	d.
*144¼ Rods of Walling at 30 Shillings per Rod and 5 Guineas extra	221	12	6
One new Sea Gutter 5 feet clear run	60	0	0
Removing and altering another	10	0	0
Filling up Rills	50	0	0
Planks, Barrows and other tools	15	0	0
Carting do. and extra's	6	0	0
Total	£. 362	12	6

W. C. STANES, Miniſter.

G. KEYS, Churchwarden.

JONAS ROLPH,
JAMES ROBINSON, } Overſeers.

* The Marſh Rod contains twenty-one feet.

In the IVth Volume of these Transactions, page 24, a Letter from Mr. John Ross, Professor of Church History in King's College, Aberdeen, is inserted; wherein a short historical account is given of the introduction of the Turnep-rooted Cabbage, into the northern parts of Great Britain, and some good effects of its cultivation in that Climate shewn. The following Letter from the same Gentleman, is a still further proof of the utility of that Plant; and if it shall hereafter be found that it can be cultivated to advantage in the broad-cast manner, hoeing the Plants properly, as is practised in the best culture of the common Turnep, Farmers in general may be induced to adopt it for Spring food for Cattle and Sheep, to which by its hardiness, it is particularly and excellently adapted.—The experiments of Sir Thomas Beevor,

hereafter

hereafter quoted, give great reaſon to believe this to be the caſe, although it is well remembered, that the late Mr. JOHN REYNOLDS of Adiſham in Kent, to whoſe care and attention the Kingdom is indebted for the firſt introduction of the Turnep-rooted Cabbage, for the purpoſe of feeding Cattle and Sheep, and who was rewarded by this Society with a bounty of fifty pounds, for his communications on that ſubject, was fully of opinion, that all circumſtances attending the Broad-caſt Culture conſidered, the cultivator would be more ſure of ſucceſs, if the Plants were raiſed on Seed Beds, and afterwards tranſplanted into Rows at proper diſtances, than if the common mode of ſowing Broad-caſt, and hoeing, was practiſed; as in this latter manner, there is certainly more danger of ſuffering injury by the Fly, than in the former one;

yet as the common Farmers will be moſt likely to cultivate this uſeful Plant, if they can do it advantageouſly, in the manner they have been accuſtomed to manage Plants with which they have been long acquainted; the Broad-caſt method, may be conſidered as advantageous; but it will be well worth the attention of gentlemen, to make a full and fair compariſon of the two methods, and ſhew to their neighbours which is the moſt profitable.

The Society, fully ſenſible of the merit of Mr Profeſſor Ross, have voted to him a Silver Medal, for his attention to the views of this Inſtitution, by introducing the culture of the Turnep-rooted Cabbage into the northern parts of the iſland of Great Britain.

SIR,

Aberdeen, Decr. 13, 1787.

SIR,

AFTER repeated trials of the Turnep-rooted Cabbage, in the counties of Aberdeen and Banff, I can now venture to assure you that they thrive extremely well in this northern climate; and that there is the greatest probability of their becoming a very valuable acquisition to Farmers, as a Spring food for Cattle and Sheep, after the Turneps are consumed or become unfit for use.

For two or three years, those who made trial of Turnep-rooted Cabbage, in this Country, raised them in the manner directed in the first Volume of your Transactions; but the trouble and expense of sowing them in a Seed-bed, and afterwards transplanting them, discouraged many Farmers from attempting to raise

them in large quantities; to obviate which, a gentleman in this neighbourhood, made a trial about the beginning of June 1786, of ſowing ſome of the ſeed broad-caſt, in a field properly prepared for Turneps; and had the ſatisfaction to find that the crop ſown in that manner, and managed in the ſame way with the Turneps, was fully equal to that which he raiſed from Plants ſown in a Seed-bed in April, and tranſplanted about Midſummer.

This ſucceſsful experiment, I was about to communicate to you in February laſt, when the third Volume of Letters and Papers of the Society inſtituted at Bath, fell into my hands, which rendered the communication unneceſſary, as a moſt diſtinct and ſatisfactory account is there given by Sir THOMAS BEEVOR, of his ſucceſs in raiſing them in the ſame manner for ſeveral years paſt.

A trial was made at Cullen Houſe, this laſt ſummer, to raiſe this valuable Plant, agreeably to Sir THOMAS's directions, and it has ſucceeded admirably.

A part of a field prepared for Turneps, was ſown broad-caſt about the middle of June, with the ſeed of the Turnep-rooted Cabbage, and treated in every reſpect, as to hoeing, thining, &c. like the common Turnep; and the crop which I ſaw about three weeks ago has turned out extremely full and rich.

Another trial was made at Cullen-Houſe, laſt Summer, by drilling the ſeed the middle of May, in ground properly prepared; the Crop was very fine, and the Cabbages grew to a great ſize, but a large proportion of them ran to ſeed, in the months of October and November; which convinces me that they were ſown

at too early a period; and that the moſt proper ſeaſon for ſowing them in this part of the Country, is from the firſt to the middle of June.

I have the honour to be with much reſpect,

Sir,

Your moſt obedient

and moſt humble ſervant,

JOHN ROSS.

Mr. More.

Few

FEW objects ſeem of ſo much importance to Agriculture, as the aſcertaining the comparative advantage, of the Drill and Broad-caſt method, in the culture of Wheat, Barley, Oats, Beans, &c. and in the Vth. vol. of theſe Tranſactions, an account is given of a large quantity of land having been ſown in Drills, by Mr. JOHN BOOTE, of Atherſtone upon Stour. This year the ſame gentleman, having cultivated (as appeared by the certificates ſent to the Society) four hundred and fifty Acres of land, in Drills, the Gold Medal, being the premium offered for comparative culture of Wheat, was adjudged to him; and theaccount of the experiment, and the ſucceſs attending is contained in the following Papers.

Atherſtone

Atherſtone upon Stour, near Stratford upon Avon, Warwickſhire, Feb. 2, 1788.

SIR,

ON peruſing the laſt Volume of Tranſactions of the Society for the Encouragement of Arts, Manufactures and Commerce, I find that my aſcertainments of drilled Crops, upon a ſcale of three hundred and ſixty-eight acres, in the year 1786, did not eſcape the notice of the Society. This encourages me to furniſh the Society with a further account of my ſucceſs in drilling, upon a ſcale of four hundred and fifty acres in the year 1787. From the time I had drilled the above three hundred and ſixty-eight acres, in the year 1786, to the time of harveſt, or ſo near harveſt, that the crops exhibited a ſtriking ſuperiority in favour of drilling, I ſuppoſe no one perſon in whatever enterpriſe or novelty he might be engaged,

was

was ever held more cheap or more vehemently exclaimed againſt, by all his neighbours than I was; as having acted with the greateſt impropriety, by trying the Drill upon ſo extenſive a ſcale.

At harveſt, their cenſures were ſomewhat abated, and they contented themſelves with obſerving, that though the Drill had for that ſeaſon, ſucceeded well with me, it might not ſucceed equally with them, nor in all ſeaſons. A ſuperiority in my drilling, compared with their broad-caſting, upon ſoils much ſuperior to ſome of mine, they were willing to acknowledge, but unwilling to attribute any merit to the ſyſtem of drilling, or the Machine that performed the work; nor could they think of any thing as the cauſe of ſo ſtriking a ſuperiority, but chance, or ſomething which they did not underſtand; and truly, in this ſomething

which

which they did not underſtand, was compriſed the whole myſtery, viz. a regular diſtribution of conſiderably leſs than half the quantity of ſeed uſually ſown broad-caſt, and that at proper depths and diſtances in the land.

I will not ſay that ſo general a diſapprobation of the ſyſtem of drilling, together with the candid expoſtulations of ſome of my particular friends, who had an eye to the conſequences of the enterpriſe upon ſo large a ſcale, if it ſhould not ſucceed, would not have more or leſs cooled my zeal for the ſyſtem, at leaſt ſo as not to extend the ſcale of it the ſucceeding year, if I had not by actual experiments, comparatively made between drilling and broad-caſting, for more than ten years laſt paſt, in which the effects of wet and dry Summers, were particularly obſerved, compleatly made up my

mind

mind on the ſubject; ſo compleatly, that nothing but the want of the Drill I am now in poſſeſſion of, would have prevented me putting the ſyſtem in practice upon the ſcale I now have it, ſeveral years ſooner. Surpriſing as it appeared to all my neighbours, that I ſhould hold out proof againſt all admonition, being frequently told that my obſtinacy would be my ruin, I had one ſupport unknown to them, in which I placed my whole truſt, viz. facts derived from experimental demonſtration: this was my ſtrong fort, which after weathering out many ſtorms and tempeſts, at almoſt every fair and market, covered my entrance into a ſafe harbour, at the end of the year 1786, with a clear profit of five hundred pounds for my ſupport, during the winter, and the ſupport of the drill-ſyſtem, the enſuing year: I mean five hundred pounds more than I ſhould

have

have gained, if I had ſown my land broad-caſt.

Thus ſupported by facts and experiments, it cannot be wondered that I ſhould perſevere in a practice in which I had already been ſucceſsful, and againſt which nothing appeared, but opinions only, and thoſe for the moſt part, built upon weak foundations; opinions too weak to claim the attention even of a theoretic farmer, and lighter than wind itſelf, on the ſcale of a practical Driller.

And indeed, if all the world had been unanimous, as all my neighbours were, in their opinion againſt me, and I had been left alone in the field, as in fact I was, ſupported only by Mr Cooke's Drill, and a firm belief that ſimilar cauſes would produce ſimilar effects, I ſhould certainly have acted juſt as I have done.

I have already obſerved, that at the time of harveſt, 1786, the viſible ſuperiority of my Crops, put to ſilence all clamours againſt them; and many oppoſers (mortifying as it was to ſee the beſt Crops in all the Country, produced from ſoils ſo much inferior in quality as mine are to ſome of theirs) were forced into compliance. No ſooner were my Crops carried, and a greater number of Ricks or Stacks than uſual, preſented to the public view, but all cenſures againſt and objections to the Drill, not only abated, but were ſtrongly converted into a variety of queſtions and enquiries, viz. How is it poſſible? By what means can it be that ſo much Corn ſhould ſpring from ſo little Seed? and particularly ſo much more than uſual, from the ſame quantity of Land: Since this is the caſe, the beſt Farmers in the Country, are all in the dark; every one muſt learn his

buſineſs

buſineſs afreſh, with this general queſtion at parting, And do you really, Mr BOOTE, intend to continue practiſing the Drill ſo extenſively on your farm, for time to come? My anſwer in general was, Wait with patience, and you ſhall ſee. And accordingly I exhibited upon my farm, in 1787, four hundred and fifty acres of drilled Crops, growing at one and the ſame time, viz. Wheat, one hundred and twenty-ſix acres: Barley, one hundred and twenty-eight: Beans, forty-five: Peas, eighteen: Oats, forty-five: Vetches, ſix: Turneps, eighty-two.—As the reſpective Crops came into ear, a decided ſuperiority in favour of drilling, was again ſelf-evident, every obſerver became an admirer, the moſt ſtrenuous oppoſers became the moſt ſtrenuous advocates, and every one appeared anxious only to avail himſelf of the means of doing likewiſe.

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From the time my Crops were drilled, to the time of harveſt, they were viewed by thouſands of ſpectators, many of them from afar; and to the beſt of my knowledge, not one of them went away diſſatisfied; and no wonder, for crops of Corn ſo luxuriant in themſelves, ſo far ſurpaſſing all my neighbours, at the ſame time produced from Land not of the firſt quality, could not fail to challenge the approbation of every beholder: And I humbly preſume that I might ſafely venture to challenge all the world to furniſh their equal, as to quantity and quality of drilled Corn upon one farm in one year. And I am confident I ſhall upon a fair calculation, gain by drilling, this year, viz. 1787, at leaſt ſeven hundred pounds more than I ſhould have done, if I had ſown my land in the uſual way: ſurpriſing as this may appear, it is not more ſurpriſing than it is true. And I

ſhould think the aſſertion can hardly fail of carrying conviction with it, eſpecially when it is conſidered, that Corn grown in the open field, carried in the open day, tythed in kind by the common tythingman, expoſed to view in barns and ſtackyards; threſhed, dreſſed, and meaſured, by common ſervants, and ſold to common purchaſers, will hardly leave room for a miſrepreſentation of facts, which ſpeak for themſelves in ſo many inſtances, and open to detection from almoſt every quarter, particularly the tythingman, who if he threſhed the Corn carried from my farm by itſelf, knows the quantity of my whole Crop as well as I do; and my books contain an exact account of every buſhel of grain ſold, and to whom. But if a miſrepreſentation ſhould even be ſuppoſed, I muſt beg leave to aſk, what intereſt can I have in deceiving the public? I may be blamed

by

by ſome farmers, for having ſpoken thus openly, at the ſame time I am under no fear of being detected in an error by any. If others chooſe to ſmother and conceal their ſucceſs in drilling, I profeſs to be influenced by other motives, viz. the public good; and if I have any other gratification in thus communicating to the world theſe facts through the channel of the Society's tranſactions, it is that of being the firſt who has hitherto done it upon ſo extenſive a ſcale.

On peruſing the conditions upon which a premium is held out by the Society, for aſcertaining the moſt advantageous method of cultivating Wheat, by Drilling or Broad-caſting four acres of each: It was my intention to make the experiment accordingly, notwithſtanding I had reaſon to believe by the reſult of my laſt year's experiments, which the Society is

already in poſſeſſion of, I ſhould loſe ſixteen pounds by ſowing four acres broad-caſt, compared with the produce ſuppoſing it to be drilled; but as it happened, an opportunity offered itſelf of making the experiment according to the conditions held out by the Society, and without any loſs to myſelf, as follows, at the time I was drilling my land with Wheat, being about twenty acres in one piece, my next neighbour was ſowing broad-caſt a piece of land about eleven acres adjoining to it, the ſoils of both of the ſame quality, viz. a loam, only divided by a fence; the preparation of both pieces for Wheat, was the ſame, viz. Beans, with this difference only, that my neighbour's land was ſet by hand or dibbled and hoed; mine was drilled and hoed, his was alſo manured for Wheat after the Beans: mine was not manured at all: his ſown broad-caſt with twentygal-

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lons of ſeed to the acre: mine drilled with nine gallons and two quarts to the acre. During the growth of theſe two Crops, every attention was paid to the comparative experiment, not only by me, but many others. Until the firſt hoeing of the drilled Wheat was performed, the broad-caſt ſeemed to have the advantage from a greater number of plants appearing upon the land; but in a few weeks after the drilled Wheat was hoed, in the month of March, it exhibited a prodigious increaſe of ſtems, more vigorous of themſelves, and of a darker green than the broad-caſt; which preference was maintained until the time of harveſt. A little before harveſt, both Crops were viewed by many judges, and unanimouſly determined in favour of drilling, in the proportion of three to two, as Mr PAYTON of Stratford upon Avon,

has herewith certified; the above ſuperiority in favour of drilling, compared with broad-caſting, was nothing new to me, having uniformly experienced the ſame for ſeveral years upon different loams, which is the reaſon I had not a ſingle perch of broad-caſt corn, upon any of my loams, this year. If there remained any doubt with me, as to drilling having the advantage over broad-caſting upon any particular ſoils, it was upon cold ſtiff clays, which I had not an opportunity of trying till I had Mr COOKE's Drill.

The reſult of the firſt experiment I made between drilling and broad-caſting upon a cold ſtrong clay, the Society is already in poſſeſſion of: The reſult of the ſecond, will be found among my drilled Crops of the year 1787, which will accompany this letter. From every

every obſervation I have been able to make of the two laſt experiments upon clays, and my former drilling upon different loams, I am inclined to believe that there is hardly a piece of land to be found that will not admit of greater profits by drilling and hoeing, than broadcaſting, provided that drilling and hoeing are properly attended to. In proportion to the additional labour and expenſe required in cultivating clay ſoils in the uſual way, compared with tractable loams, ſo I have found the additional labour and expenſe of drilling and hoeing ſuch ſoils; at the ſame time it may be obſerved, that as clay ſoils are in general more productive than loams, particularly in Beans and Wheat, there is no fear but the cultivator will be well rewarded by ſuch ſoils for all his additional labour and attention.

I was ſo well ſatisfied with ſeventy-two buſhels per acre, of drilled Barley, in the year 1786, that I did not ſow one handful broad-caſt in the year 1787, though I had no ſooner finiſhed my Barley, but it occurred to me that an account of an experiment comparatively made between drilling and broad-caſting Barley, might not be unacceptable to the Society; on which account, I prevailed upon a neighbour, Mr WILLIAM GREENWAY of Alſcott, to make an experiment upon a piece of land joining to mine, and under the ſame cultivation; and excluſive of the hoeing not being performed in due time, he has authoriſed me to ſay that his drilled Barley yielded him ſixteen ſhillings per acre more clear profit than his broad-caſt Crop yielded. And as a proof of his being a convert to the Drill Syſtem, he has this year drilled

two

two thirds of his Wheat-crop, which looks as well as mine.

When I tranſmitted to the Society an account of my ſucceſs in Drilling in the year 1786, it was my intention to have taken a particular account of the expenſe of hoeing my drilled Crops in 1787; but this I found to be impoſſible, having ſometimes near one hundred men, women and children, who came at different times of the day (for I took in all that came for work) and were employed at different prices, ſome in one part of the field, ſome in another, and ſometimes altogether: and ſo ſtrenuous an advocate am I for hoeing, that if twice the number had applied for work, I believe I ſhould have employed them all, being fully convinced by paſt experience, that all the expenſe ſuppoſing it had been conſiderably more than it was, would be doubly repaid to

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me, not only in the preſent but future Crops. In favour of hoeing too much cannot be ſaid; the weeds that are ſuffered to bring their ſeeds to maturity, will ſtock the land with thouſands; by this means my neighbours lands are every year growing fouler and fouler, while mine by the weeds being cut up in their infancy, are growing every year cleaner and cleaner, excluſive of being under the neceſſity of making a Summer Fallow of ſuch lands every fourth or fifth year, with a clear loſs of a year's rent and much labour.

Upon ſuch of my lands as are already brought into a proper ſtate of cultivation, I am very certain I ſhall never make another Summer Fallow; being fully perſuaded, that where drilling and hoeing are properly attended to, and two exhauſting Crops never taken together, but an exhauſting and an ameliorating

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one alternately, there is not the leaſt neceſſity for it. If land is kept clean from weeds, and properly prepared by a ſufficient number of ploughings at ſeaſonable times, the cultivator may reaſonably expect a crop equal to the production of the ſoil: from whence it ſhould ſeem, that drilling has every way the advantage of broad-caſting; for in a remarkably dry ſeaſon when a Broad-caſt Crop is burnt up, and the cultivator only reaps a crop of weeds, ſuppoſing the Drilled Crop to ſuffer in the ſame proportion, which is in fact granting too much, for the grain of the Drilled Crop being depoſited at a proper depth in the ſoil where there is moiſture, the Crop will flouriſh, while the Broad-caſt Crop will ſuffer: But even ſuppoſing the Drilled and Broad-caſt ſhould equally ſuffer in a dry Seaſon, if the cultivator makes all the uſe of the Hoe, which a burning Seaſon admits

admits of, in deſtroying the weeds and working the ſoil, and the Crop after all ſhould fall ſhort of his expectations, he has the pleaſure at leaſt of ſeeing his land cleared of weeds, which will be the contrary with the broad-caſt Crop, where the failure of a crop of Corn is uniformly productive of a crop of Weeds: He will have the ſatisfactio nof conſidering, that in whatever proportion his preſent Crop may fall ſhort of his expectations, if his land has been properly hoed and kept clear from weeds, he has reaſon to expect that his next ſucceeding Crop will be the more abundant.

When Land is laid down with Graſs-ſeeds, it is uſual to ſow the Seeds when Barley is ſown; but in Drilling, if Graſs-ſeeds are ſown when Barley is ſown, the hoeing cannot take place, therefore ſoon-

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er than be debarred from hoeing, I determined to try the method which Mr. Cooke has publiſhed, of deferring to ſow Graſs-ſeeds until the ſecond hoeing of the Barley was juſt going to be performed, about the beginning or middle of May, at which time I ſowed ſeventy-two acres of Barley and Oats, with Graſs-ſeeds, and hoed them in at the laſt hoeing about the middle of May; and I have the pleaſure to ſay, that I would not wiſh to ſee a better plantation of young Clover than I have now growing upon ſeventy-two acres ſown as above.

I have often heard it aſſerted that there could not poſſibly ariſe any advantages from drilling Turneps, but from the ſucceſs which I had in drilling eighty-two acres with Turneps; I am of a very different opinion. The advantages chiefly conſiſt of depoſiting the Seed at a proper depth

depth in the ſoil, about two inches, where there is moiſture in a dry Seaſon to ſend the plants up in a few days; whereas, if they were ſown broad-caſt in a dry Seaſon, the Seed might remain in the ſoil ſeveral weeks waiting for rain to make them vegetate; and the Seed being depoſited at one and the ſame depth, will vegetate not only more expeditiouſly, but at one and the ſame time; and by getting into the rough leaf the ſooner, will ſtand a better chance of eſcaping the fly. I would nevertheleſs by no means be underſtood to infer that by Drilling of Turneps, the effects of the fly are entirely removed, notwithſtanding in ſome very dry ſeaſons, it may ſo happen by the plant getting into rough leaf before the fly begins to exiſt, by reaſon of the Seed being depoſited at a regular depth, where there is moiſture in the ſoil, but in regard to hoeing of Turneps that are drilled, the advantages

tages are conſiderable, the ſpaces between the rows will be hoed in half the time that would be required, ſuppoſing they had been ſown in the common way, and when they come to be ſet out at proper diſtances, in the rows, the ſuperfluous plants will be cut out in one third of the time uſually required, and that by women or children; this I experienced in my Turnep Crop which was required to be hoed in the moſt buſy time of my harveſt, and was done by women and children: whereas if they had been ſown broadcaſt, I ſhould have been under the diſagreeable neceſſity of ſending a number of my beſt workmen to hoe Turneps.

It may appear ſomewhat extraordinary that I have not fail'd, in any one ſeaſon to raiſe a valuable Crop of Turneps for fourteen years laſt paſt, and in my method of cultivating Turneps, I am tolerably

ably eaſy as to all apprehenſions of the effects of the fly, which is looked upon by moſt Farmers as a very ſerious affair: this method I would have deſcribed at large, but leaſt I ſhould be too troubleſome to the Society, I will defer it until ſome future opportunity,

I am Sir,

your very humble Servant,

JOHN BOOTE.

MR. MORE.

Account

Account of the Crops, produced from Seed ſown on the Eſtate of Mr. JOHN BOOTE, of Atherſtone upon Stour, near Stratford upon Avon, in Warwickſhire, in the Year 1787, by a Drill Machine invented by the Rev. JAMES COOKE.

		Land meaſured. A.	R.	P.	Produced. Buſh.	Gal.	Pts.	Prod. per Acre. Buſh.	Gal.	Pts.
No. 1	Beans drilled upon loamy ſand after Oats	0	1	27	24	2	3	58	0	1
2	Wheat drilled upon marl and mixed ſoil after Beans	0	1	4	9	7	2	36	0	1
3	Wheat drilled upon loamy ſand after Beans	0	1	0	12	5	5	50	6	4
4	Barley drilled upon loamy ſand after Turneps	0	0	38	17	7	6	75	5	2
5	Barley drilled upon ſandy land after Turneps	0	1	34	27	0	6	58	4	4
6	Peas drilled upon loamy ſand after Clover	0	1	9	15	6	3	51	4	5
7	Wheat drilled upon poor clay after Clover	0	2	26	16	7	2	25	4	1
8	Wheat ſowed Broadcaſt upon poor clay after Clover in the ſame ground	0	3	24	12	4	1	13	7	2
9	Wheat drilled upon loamy ſand after Beans	0	1	6	13	1	0	45	5	1
10	Oats drilled upon ſandy land after Barley	0	1	8	22	5	1	75	3	6
11	Oats drilled upon loamy ſand after Barley	0	1	29	33	1	1	76	6	6

N. B. The two laſt Crops contrary to Mr. BOOTE's practice of never taking two exhauſting Crops together, were taken in order to bring the land into a regular rotation of Crops.

The above account was ſurveyed, the land meaſured, and the workmen examined by me

Wimpſtone, near Stratford upon Avon,
December 10, 1787.

JOSEPH BARBER.

THIS is to certify, that I viewed, at the requeſt of Mr JOHN BOOTE of Atherſtone upon Stour, near Stratford upon Avon, on the 3d day of Auguſt 1787, his experimental Crop of Drilled Wheat, and his neighbour's Broad-caſt, in the adjoining field; when to the beſt of my judgment, there appeared to be an evident ſuperiority in favour of the drilled Crop, of one third at leaſt. The Straw and Ears of the drilled Wheat, nearly twice the length and ſtrength of the Broad-caſt ones. I rubbed out the Corn of ſome of the Ears of both Crops, and found, upon the average, ſeventy grains in each Ear of the Drilled, in the Broad-caſt, thirty-five; and neither ſo bright, not ſo large, nor ſo well vegetated as the Drilled. Afterwards I went through ſeveral other Crops of the ſaid Mr BOOTE's drilled Wheat, as well as Broad-caſt Crops belonging to other neighbours;

and to my great ſurpriſe, found there a proportionable ſuperiority; which has made me a convert to Drilling.

JOHN PAYTON.

Stratford on Avon,
Feb, 2, 1788.

AFTER a due examination of the foregoing Papers by the Committee, to whoſe conſideration the buſineſs was referred, the Secretary was directed to write to the Candidate, requeſting him to inform the Committee

" Whether the 2 R. 26 P. drilled on
" poor clay, No. 7, and the 3 R. 24
" P. ſown broad-caſt, No. 8, were
" the whole of the land ſo drilled
" and ſown in the ſame ground? and
" if not, what was the whole quantity
" of each? And a letter was alſo writ-
" ten

" ten to Mr. Payton, desiring him to
" inform the Committee, whether he
" signed the Certificate, and requesting
" him to take the trouble of enquiring
" of the neighbour alluded to in Mr.
" BOOTE's Letter, and his own Cer-
" tificate, whether the soil of his land
" is similar to Mr. BOOTE's? Whether
" it was cultivated with beans in the
" preceding year and manured pre-
" vious to its being sown with Wheat,
" as set forth in Mr. BOOTE's Letter?
" and should the neighbour have thrash-
" ed the Wheat grown in the Field,
" it will be highly satisfactory to the
" Committee to be informed, what
" was the average produce per acre?
" and that it is wished such neighbour
" would attest these matters under his
" own hand."

In anſwer to theſe queſtions, the following Letters were received.

Stratford upon Avon, Feb. 15, 1788.

SIR,

AGreeable to your requeſt, I take this opportunity of aſſuring you that I ſigned Mr BOOTE's Certificate.—You likewiſe deſired me to enquire of the neighbour alluded to, in Mr BOOTE's Letter and my own Certificate, whether the ſoil of his land is ſimilar to Mr BOOTE's? he acquaints me it was as nearly as poſſible.—That it was dibbled with Beans the preceding year, and manured previous to its being ſown with Wheat.

He has not thraſhed the Wheat grown in that field, but as near as he can poſſibly calculate, he believes that it will not produce twenty-four buſhels per acre.

Mr

Mr SALMON, who is the neighbour alluded to in this Letter, hath joined his name with mine, as a full conviction of the circumſtances that are here related.

I am, Sir,

Your moſt humble ſervant

JOHN PAYTON.

THOMAS SALMON.

MR. MORE.

Atherſtone upon Stour, Feb. 28, 1788.

SIR,

I Was not at home when your favour of the 12th arrived, or I would have anſwered it ſooner. Not being upon the field when the broad-caſt Wheat, No 8, was ſown, I examined my ſervants reſpecting the quantity of land ſown; to my great ſurpriſe, and contrary to my intention, find the Broad-caſt meaſures four acres forty perch; the Drilled, ten acres three rood: and as a confirmation of the above, CHARLES CHAPMAN and THOMAS PITOWAY, who performed the buſineſs, have here ſigned their names with me.

I am, Sir,

Your very humble ſervant,

JOHN BOOTE.

CHARLES CHAPMAN.

THOMAS PITOWAY.

MR MORE.

IN

IN the former Volumes of theſe Tranſactions, mention has been made of a large ſpecies of Hemp growing in China, and of which ſome Seeds were ſent to the Society by the Eaſt India Company, and diſtributed to the Members and other Gentlemen who appeared likely to cultivate them: Notwithſtanding the Plants grew well in moſt places, yet the Society have not received any account of the Seed ripening, except what is contained in the following Letters from Dr. HINTON. As it now is evident that this Plant may be brought to maturity in this Climate, it remains only to be ſeen whether it will continue to retain its great ſize, or will diminiſh and become the ordinary Hemp of Europe; and this, the experiments the learned Cultivator promiſes to make, will in a few years determine.

At the close of the account of the Chinese Hemp, in the first Letter, will be found a few comparative observations on the Drill and Broad-cast Husbandry, from experiments duly and accurately made; and as every circumstance that may tend to elucidate so desirable a point in agricultural pursuits, as ascertaining the comparative advantages of the two methods, are at this time highly acceptable to the Publick, they are here inserted.

The

The SILVER MEDAL was voted to the Rev. Dr. HINTON, for his attention to the culture of the Chineſe Hemp, and the other obſervations contained in his Letters.

Northwold, near Brandon,
Jan. 14, 1788.

SIR,

THE Chineſe Hemp Seed, you ſent me, was ſown May 17, 1786, on a rich open ſoil proper for the growth of Hemp, which had been properly manured and cultivated. There was no appearance of vegetation until June 6th, when a few weak Plants came up. Theſe, notwithſtanding ſome fine ſhowers, which fell about that time, retained ſo ſickly a complexion, and had on the whole ſo unpromiſing an appearance, that deſpairing of ſucceſs I abandoned the experiment.

Buck-

Buck-Wheat was then harrowed into the land for a Fallow Crop. In the beginning of October, the perſons employed in cutting the Buck-Wheat, diſcovered ſome Seed in the heads of ſome ſtraggling Hemp Plants which had been ſuffered to grow in the crop; theſe, carefully threſhed, yielded three pints of ſeed tolerably bright and heavy. May 10, 1787, the Seed laſt mentioned, was ſown on good land in high condition: May the 19th, there was a plentiful ſhoot of healthy Plants, which grew vigorouſly all the ſeaſon. Auguſt 13th, the Thimble or Male Hemp, was drawn, as on October the 9th, was the Carle or Female Hemp. The whole was put under the care of Mr NEGUS, a conſiderable grower and manufacturer of Hemp, at Market Downham, who ſtruck with the flouriſhing appearance of the growing Crop, came

and

and requeſted to be entruſted with the management of it when ripe.

The ſpot on which the Seed was ſown contains three hundred and twenty two ſquare yards, and produced of Hemp fit for market, or in a ſtate which would juſtify the claim of the grower to the parliamentary bounty, eighty-nine pound, or per ſtatute acre, ninety-five ſtone ſeven pounds and twelve ounces; and of Seed, three pecks and one pint, or eleven buſhels, two pecks, and half a pint per acre.

On enquiry, I find that the produce of the beſt Hemp Crops in this part of the kingdom, ſeldom exceeds ſixty ſtone per acre.

The Hemp raiſed in 1786, from the Seed I received from you was apparently of little value, and from the miſmanagement of the perſon who undertook to water

water it, was abſolutely ſpoiled. I am not competent to decide on the comparative qualities of Hemp raiſed from Engliſh and Chineſe Seeds; in point of quantity, the latter has evidently a ſuperiority: I conſider it therefore as a matter of ſome conſequence, to ſhew from actual experiment, that this more productive kind, has yet retained its ſpecific difference when cultivated in this Country; how long it will continue to do ſo, remains to be proved. I intend to ſow the ſeed in ſucceſſive Crops, until it degenerates; taking great care, as I did in the firſt inſtance, to ſow it in a ſituation where the Plants cannot be affected by the farina of Engliſh Hemp.

From the general fortune of the ſpecimens of the original Seed diſtributed by the Society, a ſuſpicion has, I find, ariſen

that

that the Chineſe had taken effectual means to defeat the intention of the Engliſh purchaſers, perhaps the national character of that people ſtrengthened this ſuſpicion.

I am now perſuaded the failure may reaſonably be aſcribed to other cauſes: I ſuſpect the ſeed I received was at leaſt two years old; our Hemp growers are decidedly of opinion that no dependance for a Crop can be had on Seed of that age: To this unfavourable circumſtance may probably be added the want of due care and attention in packing up the Seed ſo as to ſecure it in the moſt effectual manner from the injury of a voyage from the Eaſt Indies: Hemp-ſeed from its peculiar nature is ſuſceptible of ſuch injury.

Should

Should the Committee of Agriculture think proper to apply for a further ſupply, I dare ſay they will give proper directions on this point.

I am, Sir,

Your very humble ſervant,

WILLIAM HINTON.

MR. MORE.

COM-

COMPARATIVE EXPERIMENTS

In ſowing Wheat by a Drill and by Broad-caſt, at Northwold.

EXPERIMENT No I.

November 2, 1784, ſowed by the Drill one buſhel, two quarts, and half a pint of Wheat, per ſtatute acre; which produced forty-four buſhels and two quarts. Sowed Broad-caſt one buſhel and twenty-ſeven quarts of Wheat per acre; which produced thirty-eight buſhels, eighteen quarts: The land good ſandy loam-fallow. The difference in favour of the Drill, is five buſhels ſixteen quarts.

EXPERIMENT No II.

Soil, rich loam Lea, of the firſt year. October 12, 1785, ſowed by a Drill, one buſhel, two quarts, one pint and a half of Wheat per acre; which produced forty-ſix buſhels and two quarts. Sowed Broad-

Broad-caſt, two buſhels and five quarts per acre; which produced forty-one buſhels and five quarts. Difference in favour of the Drill, four buſhels and twenty-nine quarts.

Experiment III.

Fallow, open field, ſoil light, rather ſandy: October 20, 1786, ſowed by a Drill, one buſhel, three quarts of Wheat per acre, which produced twenty buſhels twelve quarts. Sowed Broad-caſt, two buſhels, two quarts per acre, which produced eighteen buſhels, four quarts. Difference in favour of the Drill, two buſhels eight quarts.

Theſe annual experiments were reſpectively made on contiguous parts of the ſame field, manured alike with ten cart loads of good ſpit yard dung per acre, and

and under the ſame cultivation. The Drilled Crop, No I. was hand-hoed three times. No II, and III. hand-hoed twice. Theſe operations coſt from ſixteen to eighteen-pence per acre. The Broad-caſt was carefully cleaned of weeds by hand, and coſt from ſeven ſhillings to ten ſhillings per acre: a great price! yet not unuſual in a county like this, overrun with red weeds.

The ſoil of Northwold is, I think, peculiarly adapted for the Drill-huſbandry, conſiſting generally of loams of various qualities, and free from ſtones; ſo that at all times, except hard froſt and wet ſeaſons, the Hoe can be worked to advantage. I have drilled Barley, Rye and Buck-Wheat, alſo Peas, on a turf ten years old, all with ſucceſs and an evident ſuperiority over my own adjoin-

ing Broad-caſt Crops, as well as thoſe of my neighbours.

But as I apprehend that comparative experiments form the moſt certain teſt, by which the merits of the two different modes of ſowing, can be determined, I ſhall ſay no more on the ſubject than that I now drill all my Corn Crops. You will pleaſe to obſerve that I confine my practice and opinion to my own ſpot, not preſuming to ſay that the Drill Huſbandry is generally proper to be purſued under all circumſtances.

You will receive ſpecimens of the Hemp per Swaffham Waggon.

North-

Northwold, Feb. 20, 1788.

SIR,

I Have ſent you a ſpecimen of the Hemp Seed raiſed in 1787, from the produce of Chineſe Seed, ſown here in 1786.

The Crops of 1787, were cultivated in all reſpects as thoſe of Engliſh Hemp are: The Land, which, I have obſerved in a former Letter, was of a good quality and in high condition, was harrowed fine; the Seed was ſown Broad-caſt, thick; the Plants, when up, were hoed and ſet out at a medium diſtance of ſeven inches aſunder. To this circumſtance I aſcribe the great length of the Stem, and the tenuity of the fibre of the Hemp: Had a much greater ſpace been aſſigned, I am perſuaded the Plants would have abounded with ſtrong lateral branches—which

are in general unproductive of Hemp; and beſides, break the ſtaple of that which grows on the ſtems.

I am, Sir,

Your moſt humble Servant,

WILLIAM HINTON.

Mr. More.

PAPER

PAPER

IN

CHEMISTRY.

CHEMISTRY.

THE many and great uſes to which Alkaline Salts are applied in various branches of Manufacture, as Soap making, Glaſs making, Bleaching, &c. &c. have rendered theſe Salts an object of the Society's conſideration; and different premiums have been offered with a view to the obtaining them at a cheaper rate than they have hitherto been ſold at. Among others, the Society in the year 1776, firſt offered their GOLD MEDAL, or THIRTY POUNDS, to the perſon who ſhould import into the Port of London, in the year 1777, not leſs than ten hundred weight of native foſſil fixt Alkali,

the produce of any part of the Britiſh Dominions in the Eaſt Indies, and fit for the purpoſe of Soap Makers. This Premium was continued without any claim being made for it, to the year 1785, and then diſcontinued.

Towards the latter end of the laſt mentioned year, an account was received by the Society, that a quantity of native foſſil Alkali, had been ſent from Bombay, by HELLENUS SCOTT, Eſq; Surgeon there: And in April 1786, about three hundred weight, part unrefined and part refined, was by order of the Court of Directors of the Honourable Eaſt India Company, delivered to the Society; who having procured trials to be made of its properties, and its value aſcertained by ſome very ingenious Chemiſts and Manufacturers. Reſolved, "that this ſubſtance being a

"mild

" mild foſſil Alkali, would prove a de-
" ſirable article in Commerce, provided
" its price did not exceed that of Ba-
" rilla; and being the produce of one
" of the Britiſh poſſeſſions in the Eaſt
" Indies, it would be more advantageous
" to have the Alkali from thence, than
" to purchaſe Barilla, from foreign
" Parts, often at an exorbitant price."

The Society therefore preſented their SILVER MEDAL to Mr SCOTT, for his having produced to them this ſample of native Indian foſſil Alkali.

The

The following Letters and Papers, contain the opinions of ſome perſons of eſtabliſhed abilities, communicated to the Society on this ſubject.

THERE are few articles of more extenſive utility to mankind, than Alkaline Salts; and perha ps there is no Country in Europe, where they are more generally uſed, or produced in ſmaller quantity than they are in England. They are abſolutely neceſſary in Dying, in Medicine, and in making of Glaſs; they are alſo the baſis of Soap and Leys, beſides their uſe in a variety of arts. For theſe reaſons, every Society with us, for the improvement of Commerce and the uſeful Arts, has offered premiums for the production of theſe Salts in the Britiſh Dominions, but hitherto they have not ſucceeded. They have indeed from vege-

vegetable matters, been able to make ſome quantity of the vegetable Alkali, like the Potaſh of the northern Countries, but they have not been ſo ſucceſsful with regard to the foſſil Alkali, which is of the ſame nature as the Barilla of Spain. We therefore are obliged to depend on Ruſſia, and the nations on the Baltic, for the vegetable Alkai; and on Spain, and the Countries on the Mediterranean, for the Foſſil. Thi has made the laſt mentioned kind ſo dear, during the war, that many Manufactures depending on it, have been entirely ſuſpended.

From theſe conſiderations, it might be a deſirable thing to ſend from this Country, (Bombay) a Salt of that nature. By the experiments I have made, it appears we have a good foſſil Alkali produced here in a rude ſtate, of the ſame qualities with the Alkali of Spain, and fit for all the purpoſes

purpoſes in arts to which that Alkali is applied.

Since I firſt mentioned to ſome gentlemen here, the advantages that might be derived from purifying this article, and ſending it to England; I have learned that it now is ſent from Bengal, by contract, and in conſiderable quantities, at the rate of twelve Rupees, a Maund of nearly eighty-two pounds averdupois.

The quanity of Salt that might be got here every year muſt be conſiderable, and may amount to four or five hundred tons or more; as it would anſwer for veſſels deficient in their loading, the expenſe of tranſporting it could not be great.

I therefore beg leave to offer to your Honourable Board, to ſupply the Company

pany with the quantity of two hundred tons every year, or with a greater quantity if it is desired and can be procured; and this at the rate of three hundred Rupees a ton, which is fifty less than is allowed at Bengal, for the same quantity.

I doubt not, in case this proposal appears reasonable, your Honours will afford every encouragement for its advancement, as it has for its object the production of an article the most necessary in many of the arts of life, in a Country where they have arrived at the highest perfection, and where it is by nature almost entirely denied.

I shall only take the liberty to add, that as the Salt with which I propose the Company should be supplied, will in no respect be inferior to the Salt of Bengal, as the cost of it will not be greater, if so

great;

great; and as the quantity will be very conſiderable, I humbly ſuppoſe the ſame advantages may be procured by ſending it from this Coaſt, as from the other ſide of India.

Bombay, January 2, 1785.

SIR,

I Did myſelf the honour of writing to you about a month ago by the Reſolution Indiaman, Captain TOLMEY, and ſending a box of native Foſſil Alkali, which I ſuppoſe before the arrival of this letter, has been preſented you by Leiut. General MELVILL. I informed you, that on this Coaſt, I had obſerved the natives in the uſe of waſhing their cloaths with a brown earth, which on examination, I found to be a native fixed Alkali.

As

As this ſubſtance, I believe, has been much wiſhed for as a product of ſome part of the Britiſh Dominions, I have propoſed ſupplying it to the extent of many hundred tons, every year, on the Company's account. The Honourable the Governour and Council, have ſent that propoſal home for the conſideration of the Court of Directors.

At preſent, I ſend a box of this Alkali to the Society for the Encouragement of Arts, Manufactures and Commerce, in hopes that learned Society, will conſider it a matter of uſe as well as curioſity; and that they will recommend a propoſal to the Court of Directors, by which an inexhauſtable ſupply of that moſt uſeful article, will ariſe to the Nation, in time of war as well as in peace.

As the ſhips from this Coaſt, ſeldom go home fully laden, it might be taken

in

in as ballaſt, by which the expenſe of tranſporting it would be inconſiderable.

In the ſtate in which I have ſent this, it would not exceed one hundred Rupees a ton, and perhaps is pure enough for many Manufactures. I have before informed you that this Salt is found in Sindy, in the ground near the ſea, from whence the natives dig it.

If the Society for the Encouragement of Arts, Manufactures and Commerce, ſhould honour me with any information on this ſubject, (as whether it would be proper to purify it farther before ſending it home; or whether in this ſtate, as it is cheaper and more fit for carriage, it is to be preferred.)

My addreſs is, Mr Scott, Surgeon, Bombay.

I am, Sir,

Your obedient Servant,

H. SCOTT.

Bombay,

Bombay, November 20, 1784.

SIR,

THE attention paid by the Society for the Encouragement of Arts, Manufactures and Commerce, to Alkaline Salts, made me firſt think on that ſubject in this Country; I therefore beg leave to lay before you a diſcovery I have made of great quantities of a foſſil Alkali, produced on this Coaſt by nature, and not the product of fire. I venture to call this a diſcovery, as I am, as far as I know, the firſt European who has been acquainted with the qualities of this ſubſtance.

When I arrived in India, I ſaw in common uſe among the natives, a Soap manufactured on this Coaſt, but I never could procure any of the Salt of which it is compoſed. I alſo had heard of Glaſs being made at Surat. A long while af-

terwards, I obſerved that the natives are in the uſe of waſhing their cloaths with a brown earth brought from Sindy. I found this to be a foſſil Alkali, with a conſiderable portion of earthy and vegetable matters.

This Salt is produced in pits near the ſea, and in immenſe quantities. I believe it might be procured to the extent of many thouſand tons every year. Thinking from the immenſe quantities of this Salt, and from its particular nature, being a native foſſil Alkali, it might become an object of publick uſe, I laid before the Honourable the Governor and Council here, the propoſal which I have encloſed. They have referred the matter to the Court of Directors, only agreeing to ſend home a ſmall quantity every year as a ſpecimen, until their pleaſure is known.

By

By the Company's ſhip Reſolution, I have ſent a box of the Alkali, in the ſtate in which it is found in Sindy, to the Society for the Encouragement of Arts, Manufactures and Commerce. The Salt in this degree of purity, would not exceed one hundred and fifty Rupees a ton. Perhaps the beſt ſtate to ſend it home in, might be that in which is has received a ſimple waſhing; as it is in that ſtate not liable to receive any damage, and would be cheaper than what has undergone the operation of roaſting. This I ſuppoſe would be ſufficiently pure for moſt of the purpoſes in the arts.

I cannot help remarking that I find a remarkably ſmall proportion of this NATRUM, ſufficient to ſaturate oil: perhaps this particularity may ariſe from the Cocoa-nut oil, which is the only kind I have uſed. If the learned Society for

the Encouragement of Arts, Manufactures and Commerce, ſhould think that this diſcovery may be of uſe to the publick, as opening an inexhauſtible ſupply in all times, of a moſt uſeful article, I requeſt they will take ſome notice of it to the Court of Directors, as without their encouragement it muſt be entirely loſt.

I am Sir,

Your obedient Servant,

H. Scott.

Mr. More.

Near

Near Birmingham, April 26, 1786.

DEAR SIR,

I Received your favour of the laſt month mentioning that you had ſent me two ſamples of foſſil Alkali, brought from Bombay, and that the Society for the Encouragement of Arts, are deſirous of having them examined to enable them to judge whether they may become an advantageous article of Commerce. You expreſs a wiſh that the report I ſhall make of my trials of this Alkali, may be explicit; and I hope in this, and in other reſpects, you will perceive the readineſs and pleaſure with which I endeavour to comply with your and the Society's intentions.

I firſt examined the ſample that was marked REFINED; from the taſte, I per-

ceived it was a mild Alkali; and from the dry powdery appearance, I knew it to be of the MINERAL or FOSSIL kind. To determine its ſtrength and purity, I made the following experiments.

EXPERIMENT I.

I diſſolved ten ounces of this Alkali, and I found it totally ſoluble, excepting a very ſmall ſediment, not exceeding half a grain in weight. This ſediment being diſſolved by vitriolic acid, yielded a blue Precipitate, on adding the Pruſſian Alkali, and may therefore be concluded ferruginous. But the quantity is too ſmall to deſerve any conſideration, with reſpect to the uſe of this Alkali in arts, and I ſuppoſe it either proceeds from the iron tools and veſſels uſed in its preparation, or may be ſome veſtige of the ferruginous

clay

clay with which the Alkali is mixed in its unrefined ſtate, as I ſhall afterwards ſhew.

I ſet the ſolution of the Alkali in a cool place to cryſtalize, and I obtained ſome very pure cryſtals of mineral Alkali. The remaining ſolution having been evaporated a little, yielded upon cooling, more of the ſame cryſtals. Upon expoſing the liquor to a further evaporation, a cruſt or pellicle of another Salt was formed, and the cryſtals of Alkali, which formed upon cooling, were leſs diſtinctly ſhaped than the former, on account of the other Salt, which impeded the cryſtalization and perfect ſeparation; and which appeared to be chiefly, if not entirely, marine or common Salt. The pure cryſtals obtained by the two firſt operations, and which from the peculiar form of the cryſtals, were eaſily and certainly known to be mineral Alkali, weighed eight

ounces and a half. But as ſome Alkali remained in the liquor, we cannot from this experiment infer the quantity either of the Alkali or of the neutral Salt with which it is mixed.

EXPERIMENT II.

In order to determine the ſtrength of this refined Indian Alkali, I diſſolved a given quantity of it in water, and I found by ſaturating it with vitriolic acid, that one hundred parts of this Alkali, require for their ſaturation, fifty-three parts of vitriolic acid, whoſe denſity compared with that of water, is in the proportion of eighteen hundred to one thouſand.

As I knew from former repeated experiments, that one hundred parts of perfectly dry and pure mild mineral Alkali (that is cryſtals of Alkali dried as much

as

as they can be, in which ſtate they loſe their form, and become an opake white powder) require ninety parts of vitriolic acid, of the above denſity for their ſaturation; and as it appeared from the above experiment, that fifty-three parts of this acid were ſufficient for the ſaturation of one hundred parts of the Indian refined Alkali. I inferred that ninety parts of this Indian Salt contains as much Alkali as is equal to fifty-three parts of perfectly dried mild mineral Alkali; or that a hundred parts of the Indian Salt contain fifty-eight eight tenths of ſuch dry Alkali; alſo becauſe the whole of the ſubſtance from India, was ſoluble, I inferred that the remaining forty-one two tenths out of the hundred, were water or neutral Salt, or both.

EXPERIMENT III.

I had no doubt but ſome water was contained in this Indian Alkali, therefore in order to find the quantity, I weighed four troy ounces of the Salt, and kept it expoſed during two days, to warm air; encreaſing the heat by degrees, till it equalled that of boiling water: by this operation, the four ounces were reduced to three ounces and one penny weight; that is, the loſs of weight or quantity of water expelled from this Salt by hot air, was nearly twenty-four hundredths of the whole quantity employed: Hence the remaining ſeventy-ſix hundredths were dry mild Alkali and neutral Salt. But as fifty-eight, eight tenths, were found by the former experiment, to be dry Alkali, the neutral Salt muſt be ſeventeen two tenths.

EXPERIMENT IV.

It remained to be determined of what kind the neutral Salt, or Salts were, if there ſhould be more than one which are mixed with Indian Alkali.

For this purpoſe, I ſaturated one troy ounce of this Alkali, with diſtilled vinegar; and I added to the ſaturated ſolution, drops of a ſolution of ſugar lead, till no more precipitate was thrown down. This precipitate, when dried, weighed fifty-eight grains: I then added in the ſame gradual manner, a ſolution of ſilver in nitrous acid, and the precipitate, when dried, weighed one hundred and ſixteen grains.

In order to know whether the firſt precipitation was occaſioned by a vitriolic Salt:

Salt, I tried to diſſolve this firſt precipitate, in diſtilled vinegar and pure water; and finding that it was ſoluble, I concluded that neutral Salt which the ſugar of lead had decompoſed, was not a vitriolic Salt (for the vitriol of lead is not ſoluble) but a marine Salt; and as the Salt which was decompoſed by the ſolution of ſilver, was alſo a marine Salt, I concluded that marine or common Salt, is the only Salt with which the Indian Alkali is mixed, at leaſt in any ſenſible quantity.

From the experiments of Bergman and other modern Chymiſts, it is aſcertained, that the quantity of acid contained in a hundred parts of Luna Cornea, and Plumbum Corneum, is very nearly equal to the acid contained in fifty parts of common Salt; and thence it may be inferred, that the one hundred and eighty grains

grains of the two precipitates formed in this experiment, indicated the preſence of about ninety grains of common Salt in a troy ounce of Indian Alkali, or about eighteen and ſeven tenths of common Salt, in one hundred parts of the Alkali, which proportion is only about one eighteenth part different from the proportion deduced from the third experiment.

From the above experiments, it appears that one hundred parts of the Indian Alkali, conſiſts of fifty-eight parts, eight tenths of dry mild mineral Alkali, twenty-four parts of water, and ſeventeen parts two tenths of common Salt.

It appears alſo the Alkali contained in this Indian Salt, is in a ſtate intermediate, between that of Cryſtals, which hold a large portion of water, and that of Alkali dried as much as it can be.

It may be further proper to obſerve, that this Alkali muſt, from the circumſtance of its retaining ſome part of the water of cryſtalization, be very uncertain in its ſtrength, which will vary, according as it is more or leſs dry; and the degree of dryneſs will depend not only on the circumſtances of its preparation, but alſo on the warmth and dryneſs of the weather, and on the quantity of its ſurface that is expoſed to air; ſo that the ſame parcel will be found to vary, ſometimes conſiderably, when tried at different times.

If it be required to form a compariſon between the ſtrength of this, and ſome well known Alkali, it will be found not to differ greatly in ſtrength from Hungarian Pearl Aſh; to the average ſtrength of which however, it is rather inferior, in the proportion of five or ſix per cent.

However,

However, it is to be underſtood, when I ſpeak of the ſtrength of theſe Alkali's, that it refers only to their power of ſaturating acids, not to their quantities; for it is well known that the mineral Alkali, ſaturates much more acid than an equal quantity of an equally pure vegetable Alkali; nor to their effects in arts, which poſſibly may not be in exact proportion to the power of ſaturating acids.

Having thus aſcertained the quality, ſtrength, and degree of purity of the Indian Alkali, the gentlemen of the Society who are converſant in thoſe arts eſpecially, in which Alkali's are employed, will be enabled to form their opinion reſpecting the application of this commodity to the different manufactures; I ſhall therefore only ſubmit one or two remarks to their conſideration.

No commodity is at preſent brought to market ſimilar to this Indian Salt, either in appearance or in quality, as a refined mineral Alkali; and this circumſtance will for ſome time at leaſt, impede the introduction of it into uſe, from the ſingular averſion which Manufacturers have to trying unknown articles, an averſion not altogether ill founded, for they run ſome hazard of ſpoiling their goods when they uſe a material, with the ſtrength of which and its peculiar mode of treatment they are unacquainted; time, however, and perſeverance will overcome this difficulty.

In conſidering its utility in making Glaſs, it will be proper to diſtinguiſh the different branches of this manufacture. For Broad Glaſs, Crown Glaſs and Bottles, it will ſcarcely come into conſideration, as a ſubſtitute for Kelp and Barilla,

becauſe

becauſe it is too valuable for theſe purpoſes, and becauſe the earthy part of the Kelp and Barilla contribute, as well as the Saline or Alkaline, to the Vitrification.

In PLATE GLASS, where the Manufacturers have been uſed to employ the Salt extracted from Barilla by lixiviation, there ſeems to be a great probability of its utility; concerning which, the Manufacturers in that branch will be able to give an opinion, when they are informed, that this Indian Alkali, is a Salt of the ſame kind as that which is extracted from Barilla, and is well refined.

In FLINT GLASS, it has never been aſcertained, whether the Mineral Alkali, is as fit as the Vegetable, which is now ſolely employed. A very intelligent Manufacturer, (Mr Honeybourne) told me, about two years ago, that he had

made a trial, in making Flint Glaſs, of ſome Mineral Alkali, which was brought from India at that time, and was offered for ſale at a low price, but that it ſeemed to injure the colour of the Glaſs. He gave me a ſample of the Alkali, which I found to be very ſimilar to that ſent to me by you, but ſomewhat ſtronger. From my own former experiments in making Glaſs, I can eaſily conceive that the quantity of common Salt contained in this Indian Alkali, muſt injure the colour of Flint Glaſs, which is very delicate and eaſily affected.

The Mineral Alkali, is known to be the fitteſt for HARD SOAP; and I therefore can ſee no reaſon to doubt of the utility of the Indian Salt in this manufacture, if the price does not prevent.

For SOFT SOAP, Mineral Alkali is known to be quite unfit.

I have alſo examined the ſample of ROUGH UNREFINED ALKALI, and I find that it conſiſts of a ſaline matter, and of a quantity of rediſh ferruginous clay, equal to about eight per cent in weight of the whole maſs, upon an average of the three parcels which I tried. This clay gives a colour to the ſolution of the ſaline part in water, renders the filtration of this ſolution difficult, impedes in ſome meaſure the cryſtalization; and conſequently the extraction and refining of the Salt, are rendered thereby ſomewhat tedious, for part of the clay ſeems to diſſolve in the ſolution, or at leaſt paſſes through the filter, and forms ſome kind of union with the ſaline cryſtals, the ſhape and appearance of ſome of which are thereby altered. The ſaline matter, when ſeparated from the clay, is a mild mineral Alkali mixed with common Salt, and does not differ in any

reſpect from the refined Alkali. The rough Alkali contains a larger portion of water than the refined. Its ſtrength or quantity of Alkali contained in it, is to the ſtrength or quantity of Alkali contained in the refined ſample, as ſeventy-ſix to one hundred.

It is needleſs to obſerve, that this mixture of clay, muſt in ſome degree injure the Alkali, with reſpect to its utility in moſt of the arts, to which Alkalies are applicable; and I ſhall add, that the refined Alkali, ſeems to me to be ſufficiently pure for every purpoſe of arts, excepting perhaps thoſe few inſtances, where the common Salt may be injurious. In all other reſpects, this Alkali is clean and well refined.

I am with much reſpect and eſteem,

Dear Sir,

Your moſt obedient humble ſervant,

JAMES KEIR.

DR JOHNSON.

Good-

Goodman's Yard, January 9, 1787.

JESSE RUSSELL preſents his compliments to DR JOHNSON, and in anſwer to his, the Indian Foſſil Alkali is as under.

Refined Native Foſſil Alkali	9
Rough Native ditto	7
Rough ditto from the Cheſt	7
Ruſſia Pearl Aſh	9
Good Barilla	7
Rough Pot Eſſex Aſhes the very beſt	5½

The average price of Barilla, for the laſt three years, is twenty-ſeven pounds ten ſhillings.

The average price of Pearl Aſhes, thirty-two pounds.

Mr FALSHAW's reſpectful compliments to DR JOHNSON, informs him he has tried the Indian foſſil Alkali, and made Rochell Salt with it. It anſwered ſo well in the operation, that I eſteem it more profitable than Barilla, by one twentieth; and more ſo than the beſt Pearl Aſh, by eight per cent.

Other experiments I have not had leiſure to make.

Old Fiſh Street,
January 18, 1787.

PAPER

PAPER

IN

POLITE ARTS.

POLITE ARTS.

THE procuring accurate Surveys to be made of the Counties of England and Wales, has ever been conſidered a proper ſubject of attention by the Society; and in conſequence of ſeveral rewards beſtowed, many Maps of the different Parts of the Kingdom have been obtained; Copies of which are reſerved in the Society's Collection.

This year the GOLD MEDAL was voted to Mr WILLIAM YATES of Liverpool, for his Map of Lancaſhire; the following Letters and Certificates having been received, by which it appears that this Survey is accurately delineated.

Cuſtom

Cuſtom Houſe, Liverpool.
March 12, 1787.

SIR,

I Am informed that the Society for the Encouragement of Arts, Manufactures and Commerce, have formerly granted premiums for the Surveys of Counties, and ſtill continue to give marks of their approbation to ſuch as are executed with preciſion and accuracy.

I have deſired Mr FADEN to wait upon you with Proof Impreſſions of my Survey of the extenſive and populous county of Lancaſter; upon which I have been employed for a number of years, and flatter myſelf that it will meet with the approbation of the Preſident and Members of your Society, to whom I beg permiſſion

miſſion to requeſt you will be pleaſed to preſent it.

It has been executed wholly at my own expenſe, without any previous aſſiſtance from ſubſcriptions, and with an attention that has been honoured with the approbation of many gentlemen of the firſt character in the County; to whoſe inſpection it has already been ſubmitted, and who have been pleaſed to atteſt ſuch approbation by their ſignatures to the annexed Certificate.

Some favourable notice of it by the Society, would greatly tend to introduce it to more general knowledge in the Kingdom, and confer a laſting obligation upon

Sir,

Your obedient humble ſervant,

WILLIAM YATES.

Mr MORE.

We

We whoſe names are underwritten being inhabitants of the county of Lancaſter, do hereby certify, that we have examined the ſurvey of the ſaid county made by Mr WILLIAM YATES; and do find the ſeveral parts within our knowledge, to be a true ſurvey, and moſt accurately delineated.

Dur. Raſbotham	Bamber Gaſcoyne
Roger Deerhurſt	Nicholas Aſhton
James Hilton	John Atherton
Thomas Sunderland	R. W. Walton
Edward Standiſh	Robert Moſs
Alexander Butler	William Gregſon
R. Fletcher	Thomas B. Bayley
Miles North	Joſeph Pickford
James France	Richard Townley

Richard Wilbraham Bootle.

PAPERS

IN

MANUFACTURES.

MANUFACTURES.

SEVERAL years ſince, the Society received from one of their Correſponding Members, Dr JACOB CHRISTIAN SCHAFFERS of Regenſburg, two Volumes, containing a great variety of Specimens of Paper, manufactured from RAW VEGETABLES: As ſeveral of theſe Papers ſeemed of a good quality, it appeared to be well deſerving the attention of the Society, to have a fair trial made of ſome of the refuſe vegetable matters, that have hitherto been conſidered as of very little value, in order to know, whether they could, or could not, be advantageouſly introduced

duced into the manufacture of Paper; an article, of which the conſumption, and conſequently the price, is every day encreaſing. On this account, in the year 1787, a premium of TEN GUINEAS was offered "To the Perſon "who ſhould make the greateſt quan- "tity, not leſs than ten reams, of the "beſt and moſt uſeful Paper from ve- "getable ſubſtances not previouſly "made into Cloth."

It rarely happens that any Manufacturer is ſo ſoon induced to try experiments on ſubjects with which he is unacquainted, as it appears by the following Letters Mr GREAVES has been on this mode of making Paper; and although from not having manufactured the quantity required by the advertiſement, he could not be conſidered as entitled to the Premium offered, the

Society

Society therefore "Reſolved that not-
"withſtanding the Paper ſent in, does
"not in all reſpects equal their deſires
"(which in ſo new a work, is not at
"all ſurpriſing) yet from eight quires
"of the Paper, the produce of one of
"the experiments, it ſeems likely to
"anſwer ſome valuable purpoſes here-
"after, when the mode of working
"raw vegetable materials, ſhall be
"better underſtood:" And in conſe-
quence of the attempt made by the Candidate to forward the views of the Society, by manufacturing ſo uſeful an article as Paper from refuſe materials not hitherto applied to that purpoſe in this Country, the Society voted to Mr GREAVES their SILVER MEDAL, from whom the following Letters and Samples of the Paper were received, which ſamples are reſerved in the Society's Collection for the inſpection of the Publick.

Mill Bank, near Warrington,
Auguſt 10, 1787.

SIR,

YOU will remember that when you was here the laſt ſummer with Mr WILKINSON, you was deſirous that I ſhould attempt making of Paper from the Bark of Withins.

In conſequence whereof I have made the trial, and now ſend you by Mr Widder's waggon from Warrington, one ream of ſuch Paper, which is made rather ſtouter than I wiſhed, but that I could not readily avoid, from the tenderneſs of the material, when ground in the Engine. I ſend therewith, ſamples of the material, and how it was prepared.

In the lower part of the bundle, you will find twenty-four half quires. In the upper

upper part of the bundle, are eight quires ſomething finer, made from the Bark only, prepared and broke down in the ſtate you will find it, wrapt up in another part of the bundle.

I ſhall be glad to hear how you approve this article, which has been attended with a good deal of trouble, loſs of time and expenſe; and indeed more than I expected, but that generally happens in any new undertaking.

I preſume you will receive the parcel in about ten days;

And am, Sir,

Your moſt obedient Servant,

THOMAS GREAVES.

Mr More.

Mill Bank, near Warrington,
Decr 22, 1787.

SIR,

I Received your two Letters, which ſhould have been ſooner replied to, had I not been much from home and particularly engaged. The proceſs uſed in making the Paper ſent you from the Bark or Peel of Within Twigs, was to have it ſtript from the twig in the month of September, when the twigs are uſually cut for the making of white baſkets. I then provided about ſix hundred weight, of which I ordered about two thirds to be hackled, much in the manner of dreſſing Flax or Hemp; then dried it in the ſun, which gave it ſomething of the appearance of brown Hemp. In this ſtate it was reduced to about one hundred weight, but being attended with a good deal of trouble and ſo much reduced, I

dried

dried the remaining two hundred weight, with the leaves in its green ſtate as it was ſtript from the twig, and that was reduced about one half.

Having prepared the ſtuff, cheſt and vatt, quite clean, I chopt the clean bark or firſt preparation, and with the roller and plate quite dull and ſmooth as poſſible, I ſet the engine to work, and from it was produced the Paper of which you had eight quires ſent, being the finer ſort; and from the other was produced the coarſer Paper, of which you had the twenty-four half quires. From theſe materials I made little more than two reams, in the whole; but had I not hackled and cleaned the larger part, I expect that I could have made upwards of ten reams from them.

Nothing was uſed but the mere bark or peel of the twigs, without any Oak-

um, Hemp, or other preparation. And as I conſidered that the experiment you wiſhed, would then be made, I was not mindful of the quantity being more: But the next ſeaſon, if it be deſired, I can readily make any additional quantity, though at what price it may be ſold, or to what uſe it may be beſt applicable, I cannot ſay, but I think it may be made at about one half the expenſe of other Paper that is produced from ropes or rags, when it is made from the bark and leaves in a green ſtate, without being dried, which I ſhould recommend and conceive it will anſwer beſt.

If I can give any further information, or make any other trial that may be likely to be productive of good, I ſhall be very glad to do it, and ſhall hope to hear from you. I am, Sir,

Your moſt humble ſervant,

THOMAS GREAVES.

MR MORE.

PAPER FOR COPPER PLATES.

THE manufacturing, in England or Wales, Paper equally fit for receiving impreſſions of Engraved Copper Plates, with that imported from France, was conſidered by the Society ſoon after their inſtitution, as a proper ſubject for their encouragement: And the great improvements in the art of Engraving that have within theſe few years been made in this Kingdom, by which the exportation of Prints to foreign Countries, is become an extenſive article of Commerce, renders the obtaining ſuch Paper at this time, a very deſirable circumſtance. The Publick therefore will be well pleaſed to find, that in conſequence of the Premiums beſtowed by this Society, the making of a proper Paper is perfected by Engliſh Manufacturers.

In the Vth Volume of these Transactions, Page 231, it appears that in the year 1786, the Silver Medal was voted to Mr Lepard, as an approbation of his attempt to accomplish the intention of the Society, in offering a Premium for making, in England or Wales, Paper for taking impressions from engraved Copper Plates equal to the Paper imported from France. The same Premium being continued in the year 1787, two Candidates appeared, and the Gold Medal was adjudged to Mr John Bates of Wickham Marsh, Buckinghamshire, in consequence of a due examination of the impressions taken on the Paper, and compared with the French, and the following opinions received from the Copper Plate Printer and Artist, who had been applied to on the occasion.

LETTER

LETTER from Mr HADRILL, Copper Plate Printer, No. 11, George Street, Portman Square; dated March 26, 1787.

GENTLEMEN,

I Have made trial of the different ſpecimens of Paper received from the Society, and find upon the niceſt obſervation, that which is marked with five holes, is by far the beſt; I wetted it againſt the French Paper, and found it takes the water equally well, and will keep much longer before it mildews, and is much ſuperior to the French in cleanneſs: in this there are no Iron Moulds, which are very common in the French, and a very great defect. With reſpect to taking the impreſſion, the different Prints taken on each,

each, will ſhew by compariſon, that they appear very little, if any, inferior to the French.

I am, Gentlemen,

Your moſt humble ſervant,

PETER HADRILL.

To the Committee of
Manufactures, Adelphi.

EXTRACT of a LETTER from Mr. WEBBER to Mr. HADRILL; dated Oxford Street, No 312. March 27, 1787.

MR WEBBER informs Mr HADRILL, that he conſiders the Paper that has five holes on the margin, to be much the beſt for printing, as it is of a ſofter texture than the other, and the impreſſions are in every reſpect ſuperior. He would not have any objection to have that Paper made uſe of for ſome of his works in future.

CUL-

CULTURE OF SILK.

THE Thanks of the Society were given to PETER NOUAILLE of Greatneſs, Kent, Eſq; for the following obſervations on the Culture of SILK in England, which were communicated in conſequence of a Letter and Sample of ſome Silk produced by a Lady, who having bred ſome Silk Worms and SPUN the Silk from the Coccoons on a ſmall Wheel inſtead of WINDING it on a Reel, as is the uſual method, produced a ſample to the Society; for which, Thanks were alſo returned to her, and as the paper written by Mr NOUAILLE will fully inform thoſe perſons who may hereafter purſue the breeding and rearing Silk Worms in this Country, by what means the Silk may be reeled to the beſt advantage; it is with the permiſſion of the Author ſubmitted to the conſideration of the Publick.

DEAR

DEAR SIR,

THE idea of condemning, under my hand, the very laudable endeavours of an ingenious Lady, made me rather wiſh to ſatisfy your deſire of knowing my opinion of the merit of her propoſal, by a ſhort converſation with you on the ſubject; which I had reaſon to conclude would not have taken up more than five minutes of your valuable time: but when I called in the Adelphi this morning, with that intention, unfortunately you were not at home; I am now therefore reduced to the neceſſity of thus giving you a part of my thoughts on the ſubject of ſpinning and reeling of Silk in general, in the moſt conciſe manner I am able, by explaining to you ſo much of the proceſs, now univerſally in uſe in the principal Countries of its produce, as will enable you fully

to

to determine and decide for yourſelf, in moſt of the general caſes, in which thro' your medium, the Society may be applied to for their benevolent exertions, in ſo laudable a purſuit, by obſerving to you, that all the Ladies, who, to their great merit be it ſpoken, have hitherto exerted their ingenuity and their patience, in endeavouring to introduce the growth of Silk into this Country, have ſome how or other, been one and all very injudiciouſly adviſed to ſet out with making a courſe ordinary kind of Silk, of but little value, compared to what the Silk Worm is capable of under judicious management, at a very little more expenſe; what I mean to allude to in particular is, that all the ſpecimens I have occaſionally ſeen with you, or have read an account of in the Tranſactions of the Society, have been compoſed of eighteen to twenty Cocoons, the value of which, ſuppoſing it comparatively

ratively and intrinſically eſtimated, would not be equal to twenty ſhillings per pound of ſixteen ounces; whilſt a pound of Silk compoſed of the very ſame materials, conſiſting of only ſix or eight Cocoons, would at the leaſt value, be worth nearer thirty ſhillings per pound: and if of four of five Cocoons only, it might then vie with the moſt ſuperlative produce of Italy; and be in all reſpects, if executed with equal attention, of equal value to that for which no leſs than forty ſhillings is now demanded: From whence, probably you may be lead to conclude, that the coſt of labour or workmanſhip, might in ſome degree counterbalance the difference of their reſpective value. How far that really is or is not the caſe, you will be better enabled to form your own judgment by my ſtating to you the fact, which is, that a woman at Novi, experienced in the buſineſs of ſpinning, with the aſ-

ſiſtance

ſiſtance of a Girl to turn her Reel, and attend the fire under the Cauldron, can with eaſe, reel off one pound of Silk, conſiſting of four or five Cocoons of the moſt perfect quality, in the courſe of a day; in order to do which, with all the attention that is required, ſhe is never permitted to have more than two ſkains going upon her Reel at one time, which being compleated by noon, are ſet by to dry in the ſhade upon the Reel. Other two, upon a freſh Reel; are compleated by her in the afternoon, and ſet by to dry as the former, and are taken off the Reels the firſt thing in the morning of the ſucceeding day; when each woman's day's work, conſiſting of four ſkains, is made up in a bundle, with her name affixed to it upon a ticket, the better to aſcertain and detect any fraud or inattention ſhe may have been guilty of in its execution.

But

But when a more ordinary quality is the object, in which a greater number of Cocoons are to be united; ſhe is then permitted to have four, ſix or more ſkains going at one time, and that upon Reels of much larger dimenſions: the conſequence of which is, that her attention to each, individually, cannot be equal to the accuracy required, when ſhe is limitted to two ſkains only: ſhe now produces a courſe, foul, ordinary, uneven Silk; a day's work of which, will be equal to ſix, eight or more pounds.

Now to form a judgment of the effects of the different ſort of labour, as it affects the two different methods of operation; ſay a woman employed in ſpinning, with a girl to attend upon her, earn together much about one ſhilling per day, which in the firſt inſtance is the whole coſt of labour, to produce one pound of perfect Silk;

Silk; while in the other, eight pounds of Silk are obtained for the ſame expenſe; upon which, evidently the per poundage, amounts to no more than three halfpence, a difference of ten pence halfpenny per pound coſt of labour, in favour of the ordinary Silk; while the intrinſic value in favour of the former, falls little ſhort, ſpeaking much within compaſs, of fifteen ſhillings per pound.

Thus far, if I have ſucceeded ſo as to be generally underſtood, I hope my endeavours may have a tendency to be occaſionally of uſe to the Society, or at leaſt to you, in whatever future applications may be made to them, through your medium, on the ſubject. And now, to give you my candid opinion of the experiment, made and propoſed by a lady on the Spinning Wheel, which will hardly admit of a ſerious diſcuſſion: You undoubtedly

do, or may eaſily know, the dimenſions of the Italian Reel, of which the Society have a Model in their Collection, on the ſame ſcale as thoſe uſed abroad.

Firſt, conſider with yourſelf that Reel, which is not leſs than ſix feet eight inches circumference, ſet in motion, with a velocity at leaſt equal to the ſwifteſt going Fly of a common roaſting Jack. Then compare the dimenſions of a Bobbin, and the greateſt velocity with which it poſſibly can make its revolutions, at the Spinning Wheel, and you will not be long in pronouncing, upon good authority, that the Reel may fairly be computed to take up more than five hundred yards, in the time it would require to execute one yard by means of the Spinning Wheel, which will at once determine the inelligibility of the latter, even were it capable, as it is not, of contributing ever ſo

ſo much to the perfecting the ſtaple of the Silk, by conſolidating its filaments, which from the manner in which the operation is uſually conducted, requires no ſuch aid or aſſiſtance; conſequently, the Spinning Wheel, being incapable of meliorating the quality of the Silk, the tedioufneſs of the operation is alone ſufficient to point out its inefficacy.

I am, dear Sir,

Your moſt faithful humble ſervant,

PETER NOUAILLE.

London, March 25, 1788.

Mr MORE.

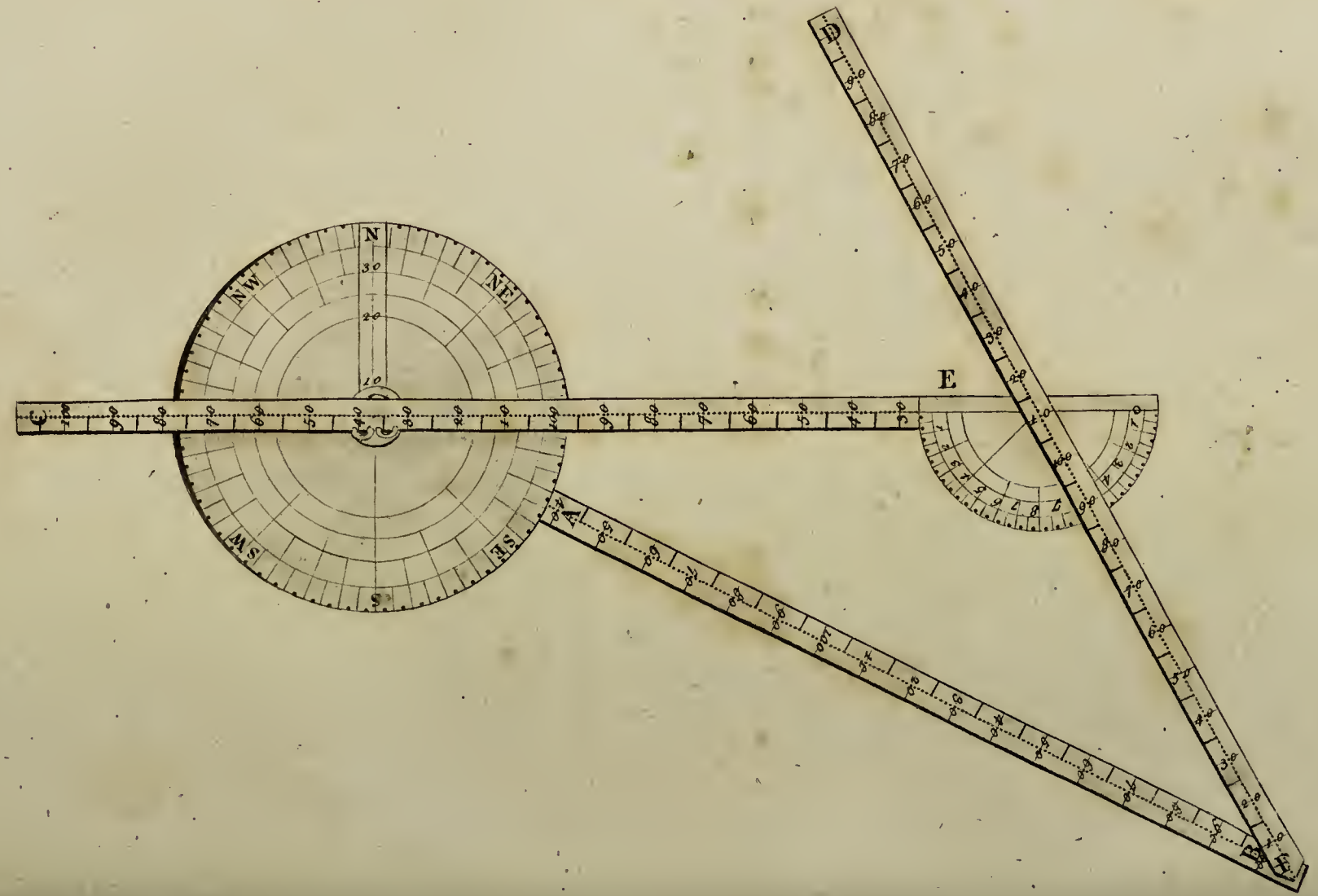
PAPERS

IN

MECHANICKS.

Plate I.

Mr. Mathew Hill's Machine for measuring Angles.



MECHANICKS.

A Bounty of FIVE GUINEAS was voted to Mr MATTHEW HILL of Scarborough, for his invention of a Machine for measuring Angles, of which the following Letter contains a Description, with References to the annexed Plate. The Machine being reserved in the Society's Repository for the inspection of the Publick.

SIR,

YOU will herewith receive a Triangular Model, and a Diagram of it; being an Apparatus which I trust will be found useful in solving trigonometrical

 questions;

queſtions; and I hope will prove not unworthy the notice and adoption of the Mathematical Inſtrument Maker, for the uſe of Schools and ordinary Seamen, in ſolving queſtions in Navigation.

A demonſtration of the uſe of the Triangle, applied in plain ſailing; Suppoſe either from a Book or Chart, the courſe and diſtance are known, but the wind not anſwering to ſail upon that point, yet keeping as near to it as I am permitted, after having run ſome time on my courſe, I am deſirous to know my direct courſe and diſtance to the Port, they may immediately be had from the Triangle, by ſetting the fixt leg A B, plate 1. to point out the given courſe and diſtance; and C E, the courſe and diſtance ſailed: then ſetting the diameter of the braſs ſemicircle paralel to the courſe ſailed, its index will ſhew how many points the courſe to the Port,

Port, differs from the courſe ſailed. When F D, is fixt with its pin in the diſtance of the deſired Port, then alſo is ſhewn the courſe and diſtance thereto.

Firſt inſtance. From Flamborough Head to the Texel is, in Diſton's Seaman's Guide, S E by E. one hundred and ſeventy-ſix miles; ſuppoſe the courſe made good, to be E, one hundred miles: Having ſet the diameter of the ſemicircle parallel to C E, then will F D, when extended to the intended Port, cut two and one quarter points for the courſe, and one hundred and eight miles the diſtance. Hence the uſe of the plain Triangle evidently appears in all caſes of plain and oblique ſailing; conſequently better than the ſinecal Quadrant, being as applicable to right angled caſes as that is.

Second

Second Inſtance. The difference of latitude and departure for a N N E courſe, one hundred miles diſtance being required; ſet A B, to the north, E C, with diſtance ſailed to the N N E, then D F, ſet to cut A B, at right angles, ſolves the queſtion; that is, on A B, is the difference of latitude, and departure on D F.

TWENTY GUINEAS were voted to Mr JOSEPH RIDLEY for his improved SECTOR and TOOL for ſetting Wheels and Pinions in Watch Work, &c. of which a particular Deſcription is hereafter given, with Plates of the Inſtruments, and for the further information of Artiſts, to whoſe uſes ſuch Tools are particularly adapted. The Inſtruments themſelves are reſerved in the Society's Collection, for the inſpection of the Publick.

DES-

DESCRIPTION

OF THE

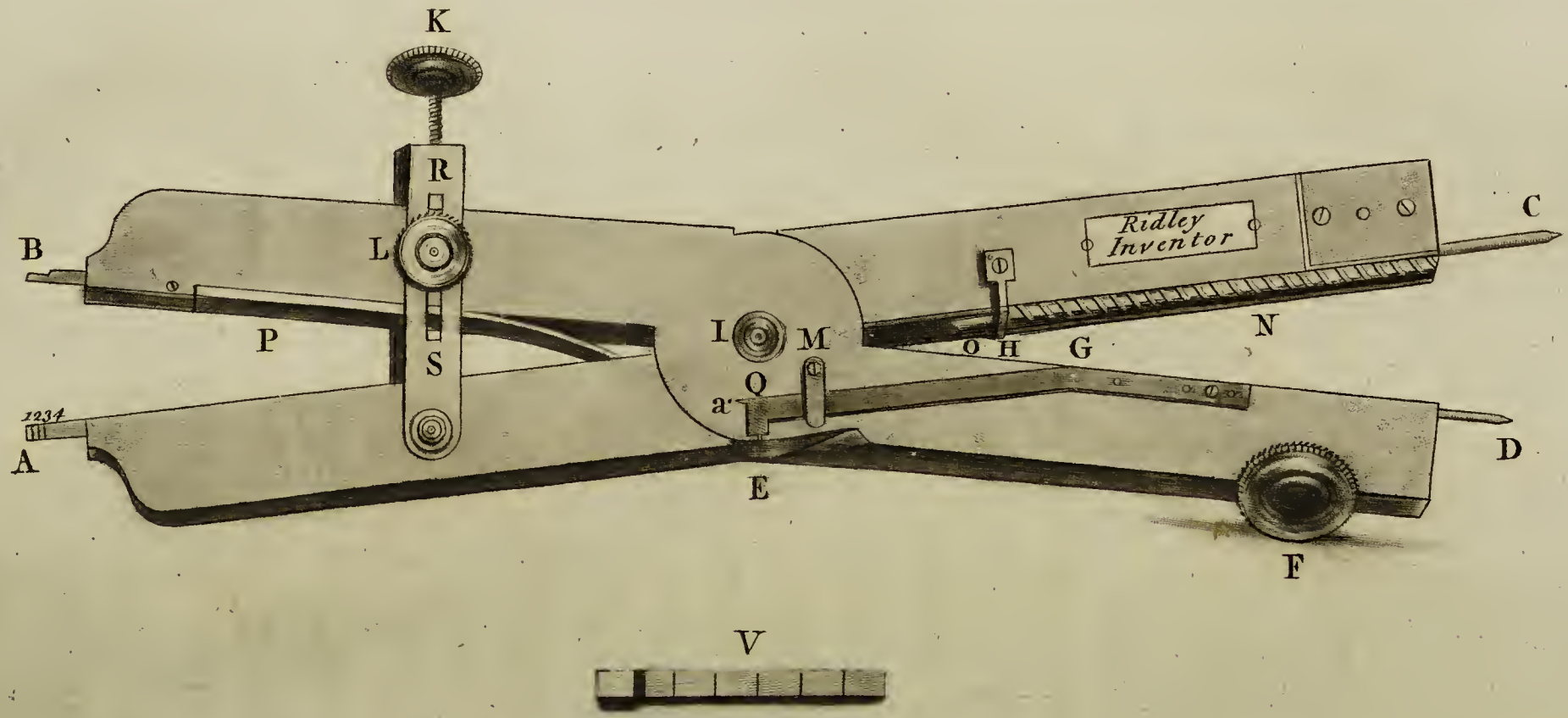
SECTOR DEPTHENING TOOL

For Wheels and Pinions of Watches, &c. invented by Mr Joseph Ridley.

See Plate 2.

A B and D, are at exact distances from the joint or center Pin I.—A and B are fixed, and the outsides of them are to be applied to the inside of the legs of the Sector, to take the semidiameter of Wheels and Pinions when added together. D, is a point moving on a center G,

Plate II.



Mr. Ridley's Sector Depthening Tool.

G, and puſhed in or out by the micrometer Screw F; and the tooth E, being at an equal diſtance from the point D, when the point Q comes to the dot a D, C, and A, B, ſtand at equal diſtances from each other. By winding up the micrometer ſcrew F, the point D, bears in; and the tooth E, is thrown out as far as the workman would have the Pinion take into the Wheel: then by putting the tooth of the Wheel againſt the Braſs, under the tooth E, the depth may be ſetas is thought proper. C, a cylinder, with a point at the extremity, that pumps up through a hole in H, directing to the center I, being a direct line from the point of the cylinder C, acroſs the center pin I, to the outer part of A. When the inſtrument is uſed, it muſt be held in ſuch manner, that the point A, is perpendicular to the point C. H, a piece of ſteel fixed on the braſs leg, with a hole

through

through it to direct the end of the cylinder C, to the center pin I. N, a Wormſpring on the cylinder C, within the braſs leg. At O, the end of the point D, is formed into a ſtrong ſpring, lying within the braſs leg, to keep D bearing againſt, and depending on the direction of the micrometer ſcrew F. E, a tooth: when a Wheel is placed under this tooth any depth, choſen, may be had by winding up the micrometer ſcrew F. Q. a point projecting from a moveable ſteel bar: when this point is exactly on the dot a, and the cylinder C pumped up, D and C, will be at the ſame diſtance from each other that A and B are. R, a Brace, that laps on each ſide the Inſtrument, to give play to the ſtrong ſpring P, which being moved by the micrometer ſcrew K, ſets the Inſtrument out or in. S, a ſlit in the Brace, to receive the ſcrew L, by which the Brace is fixed when the Inſtrument

ment is set to any desired place. At A, are four marks, and it must be observed, that when the outside of A and B, which go between the legs of the Sector, expand one quarter of an inch, you must rise A, as far as one mark above the surface of the Sector; but the end B, must at all times come even with the surface of the Sector. When they expand two quarters of an inch from each other, then you must rise A, two marks, &c.—V, a small Brass Rule an inch and an half long, divided into quarters of an inch: by setting this Rule to A, the distance from A to B, in quarters of an inch is shewn; and as many quarters of an inch, as appear, so many marks must be seen above the surface of the Sector.

DIREC-

DIRECTIONS FOR USING THE ABOVE INSTRUMENT.

WHEN it is required to find holes for Wheels and Pinions, put the Wheel to its number on the Sector, Plate 3. then try the Pinion; if found to agree for what they are to perform, add the diameter of the Pinion to the number of the Wheel, from which take the semidiameter of the two; for example, If the Wheel is 80, and the Pinion 8, added together=88; the half is 44. Then bring the Points A B, of the depthening Tool, plate 2, to 44, between the legs of the Sector; screw up the micrometer screw F, Plate 2, which throws out the tooth E, as far as you would have the Pinion take

take in the Wheel; at the ſame time incline the point D, as far in as the tooth E, is thrown out; then put the point of the cylinder C, into the hole you are to go from. Pump up the cylinder C, to bring the point D, down, to mark the place where the next hole is to be drilled, and holding A, perpendicular to C, make the mark, and drill it carefully; for ſhould you be ever ſo accurate in ſetting the Inſtrument, you may by drilling the holes improperly, utterly defeat the intention.

INSTRUCTIONS FOR MAKING WHEELS AND PINIONS FOR ANY TWO GIVEN HOLES.

Firſt, let out the tooth E, Plate 2, a proper depth; the moſt certain way is to take a Wheel, having as near as you can imagine, ſuch Teeth as your Wheel will have when cut; then put the point of the

cylinder C, into one of the holes you are providing Wheels, &c. for; pump it up: when the point D, comes down, wind the micrometer ſcrew K, in the brace, in or out as required: when the point D, comes to the center of the hole, apply the ends of the inſtrument A and B, between the legs of the Sector, at half the number of teeth you propoſe to have in your Wheel and Pinion, when added together; for example; if the Wheel be 80, the Pinion 8, together 88: half is 44; bring your Sector carefully together, ſetting A and B, Plate 2. at 44; make faſt your Sector, and make your Wheel to fit at 80, and your Pinion at 8: When they are cut, put them in the given holes, and you will find your Pinion will depthen as far in the tooth of the Wheel as you have let out the tooth E, beyond the edge of the braſs. The Pinion, when a Leader, meaſures its

full

full number; but when the Wheel is Leader, it must be observed, the Pinion is not to take its full diameter, but only at $7\frac{1}{2}$ at most, and 7, at the least; the Pinion therefore is not to be taken by its number, but by its diameter; for instance, if a Wheel has 80 teeth, and the Pinion 8, being led by the Wheel, and the diameter according to the Wheel, be but 7: add 80 and 7 together, the half of which is $43\frac{1}{2}$. After this manner all allowances must be made. In fancy work there are many methods of gauging and cutting Wheels and Pinions; but it must be observed, that from the diameter when added together, you are to take the semi-diameters.

This is a true description of, and direction for the use of my new invented Sector Depthening Tool.

JOSEPH RIDLEY.

April 14, 1788.

DESCRIPTION OF THE SECTOR

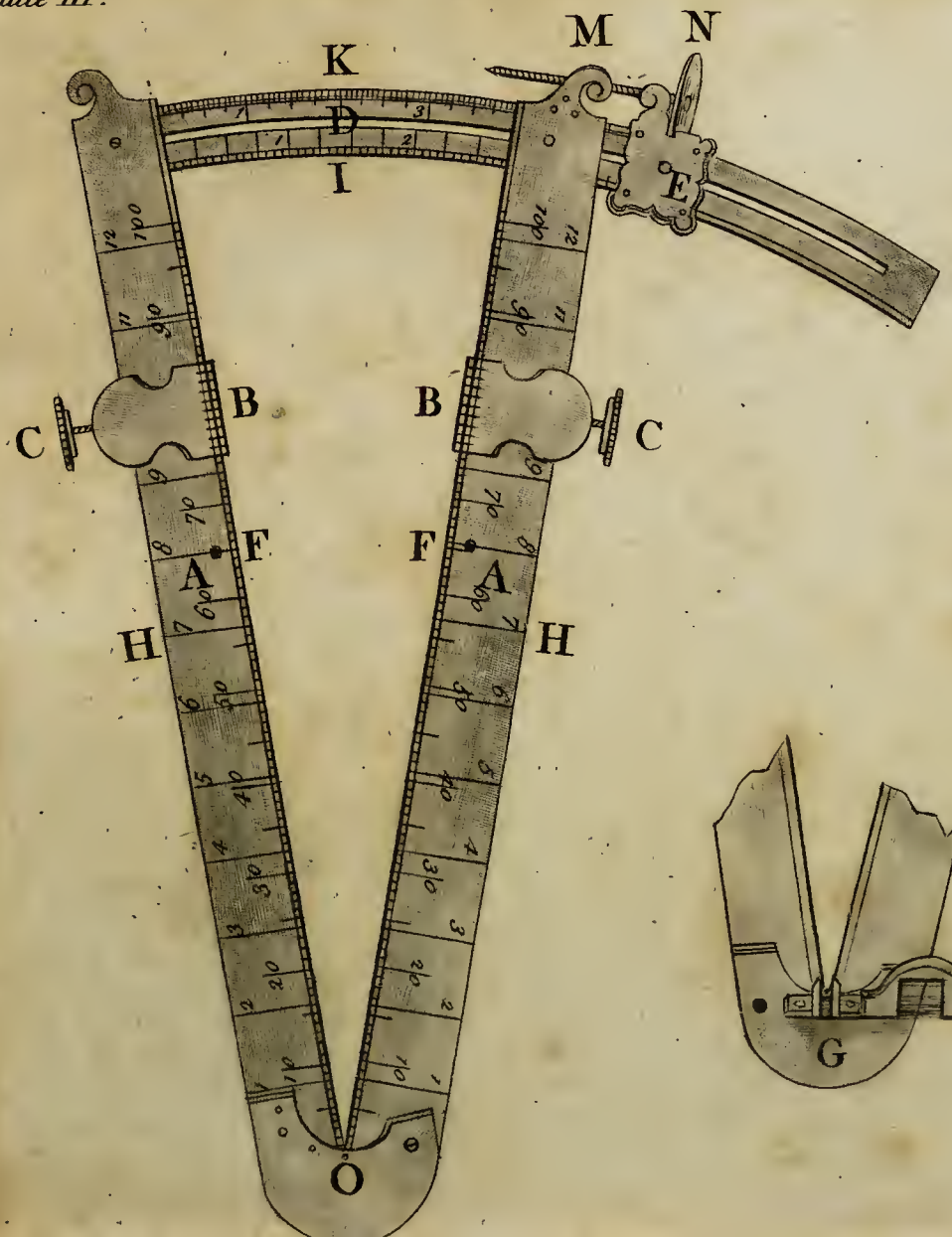
As improved by Mr Joseph Ridley.

Plate 3.

THE ſide of this Sector having the two ſcales on the arch, bears it's true meaſure from the center pin O, and is uſeful for taking the diametrical part or parts, from ſix inches to the niceſt point. In order to take the diameter of a ſphere or any part of a cone, there are employed two angles of braſs L L, having each holes in the angles 1, 2. with ſlits in the long parts; theſe are parallel when in uſe, but are only put on occaſionally, and do not remain

Plate III.

Mr. Ridley's improved Sector.



The Screw to go in the hole of one, & the slit of the other, & screws in the 60. & 70. on the scale **F.** *on the Sector, not on the wheel & pinion side but is guided by the lower Scale, never to be on but when required for Spheres &c.*

Spring Screws *Spring Screws*

remain on the Sector. The ſpring ſcrew is cut away to receive the ſcrew for hole 1, that works in hole 2. When you fix on the angles, put the ſcrew above mentioned, No 1, in the double angle near the hole; and through the ſlit of the other, ſcrew it in the hole provided between 60 and 70; on the ſcale F in the leg that the micrometer works in: put the other ſcrew in the ſlit of No 1, and through the hole of No 2, into the hole in the other leg between the 60 and 70 in F, being juſt eight inches from the center pin O, pointing from the ſcale H H; the perpendicular parts L L, ſtand up towards the arch. And by the under ſcale I, on the arch D, being figured into quarters of inches, you may find the true diameter of a ſphere or any part of a cone, &c. A A, are the legs of the Sector. BB, the ſliders, bearing ten holes each, and moving up and down to any part

of the legs to take any diameter required, with dividers, the holes being directly over the inner edge of the Sector. C, C, the nuts and ſcrews to keep the fliders cloſe to the edge of the Sector when ſet to any deſired place. D, the arch bearing two ſcales, the upper, marked K, the under, marked I. E, the follower, when ſet faſt by its ſcrew, the micrometer N, working through M, winds one of the legs of the Sector in or out in order to ſet it to any nice point. F F, are ſcales of one hundred eighths of an inch, to make the taking diameters of Wheels more eaſy. H H, are ſcales of twelve inches, directing to and dividing the inner ſcales F F, into inches. I, the under ſcale on the arch D. for the two angles of braſs L L, when occaſion requires them. K, the upper ſcale on the ſame arch ſhewing the diſtance the legs of the Sector ſtand at the twelfth inch from the cen-

ter

ter pin at all times. By this ſcale you may find diameters with great accuracy. If what you take the diameter or the length of, comes within an inch and an half by the ſcale K, then the twelve inches ſtand at an inch and an half diſtance, being 12 eighths; each inch from the center, being one eighth; and each eighth on the ſcale F, being divided into half, divides each eighth into ſixteen diſtinct parts. By the ſcale K, the Sector may be ſet to take diameters, lengths, ſquares, &c. from the ſmalleſt point to ſix inches, being the number of inches on the ſcale K.

DESCRIPTION OF THE WHEEL AND PINION SIDE OF THE SECTOR.

The ſcales F F, on the inſide of the Sector, are for Wheels and Pinions only, beginning its numbers two ſpaces from

the center pin. B B, the ſliders as before mentioned. G, two ſteel chaps to guage the Cutter proper for cutting any Wheel prepared for that purpoſe. The Blank Wheel muſt be put to the number of the Sector you would have cut. To find the ſize of the Cutter, apply it in between the top of the chaps G. If you deſire to have the ſpace and tooth equal, put your Cutter juſt half way; if wider or narrower, you may judge by putting the Cutter in or out from the mark in the middle of the Chaps. In cutting ſmall Wheels, Nuts or Pinions, the Cutter muſt go in between the Chaps beyond the mark in the middle. By the cutting a Wheel about three quarters of an inch, and a Pinion of about an eighth, the workman may judge how to guage his Cutters, according to the ſize or diameter of his Wheel or Pinion.

The

The wheel and pinion ſide of the Sector, will not tell, by the ſcale, the ſemidiameter of a Wheel, for in taking diameters on the Wheel and Pinion ſide, the two loſt at the bottom muſt be carried with the number, ſo that 80, is to be called 82 from the center pin, and 8 is to be called 10; then adding 82 to 10, makes 92; the half of which is 46. When there are two diameters to be added together, this ſcale tells right, but at no other time without carrying the loſt 2 at the bottom.

This is a true deſcription of my IMPROVED SECTOR.

JOSEPH RIDLEY.

April 14, 1788.

CAR-

CARRIAGE

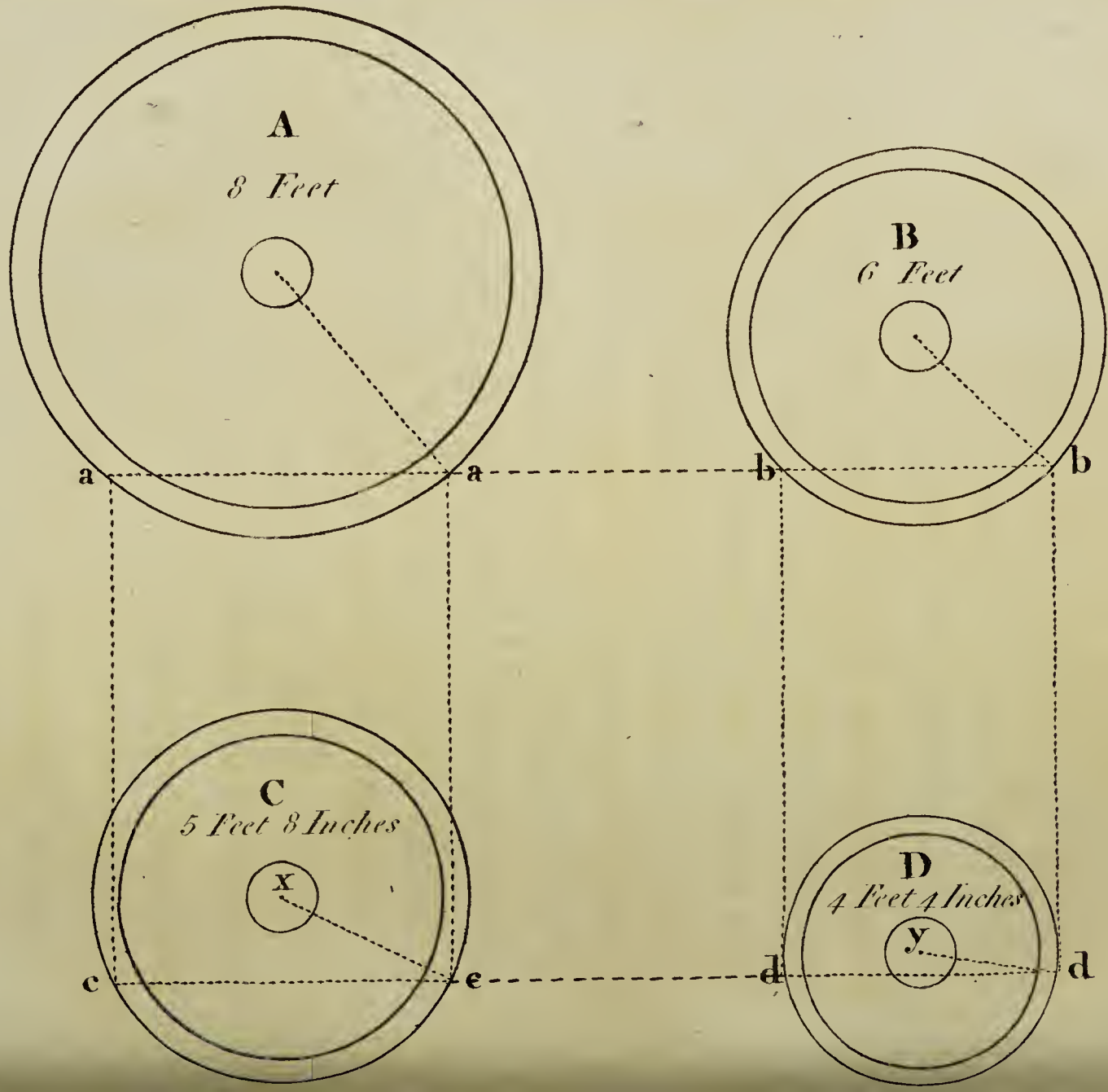
FOR CONVEYING

TIMBER, &c. OVER SOFT OR BOGGY LAND.

THE Advantages that would ariſe if a ready and commodious manner of conveying Timber or other heavy Materials, over ſoft or clayey Land, at a moderate expenſe was diſcovered, are well known to all perſons concerned in felling Timber, or tranſporting Blocks of Stone: And a premium was offered during ſeveral years, for producing to the Society, a method of accompliſhing the end propoſed. This year, a claim was made, and the premium, (TWENTY GUINEAS) adjudged to Mr JOHN BESANT of Mill Bank, Weſtminſter, of whoſe Carriage a Deſcription is annexed; and the Model produced, is reſerved in the Society's Repoſitory, for the inſpection and uſe of the Publick.

MR

Plate IV.



Mr Bemus's explanation of his Carriage.

Mr BESANT's Explanation of a CARRIAGE for conveying Timber or other heavy Materials over soft or boggy Land, and of the Principle on which the Model is conſtructed.

THE Model of the Carriage, (which is on a ſcale of three inches to a foot) it is believed will convey a proper idea: And the following explanation of the advantages of the high wheels, and troughs or ſlids, over common wheels, will, it is preſumed, give it a decided preference over other Carriages, not only for the above purpoſe, but for all common uſes; as this Carriage may be loaded by one man, and the expenſe of it is not ſo much

as

as that of a common Carriage and the Gin which muſt accompany it; for a farmer may go into the wood, cut down two poles, lay them upon the Axis and Wheels, fix them with a chain, and with the aſſiſtance of two common ſawpit rollers, he will form a compleat Carriage.

Let A B, Plate IV. be two wheels; A 8, and B, 6 feet diameter: C and D, two wheels; C, 5 feet 8 inches: D 4 feet 4 inches, being the uſual ſize of Carriage wheels. Admit the weight of an horſe to be 600 lb. the ſuperficial contents of his hoofs, 5x5. 25 inches; it is evident that for a horſe to walk, the denſity of the ſoil on which he walks muſt be ſufficient to ſupport him on three legs 25 x 3-75 inches, by which divide 600; the quotient gives 8lb. to the inch: the denſity of the ſoil the horſe requires to ſtand on; then ſuppoſing A and B to be ſunk twelve inches

ches in the ground, the length a a, of the ſurface A, and bb of the ſurface B, will be 5 feet 5 inches, and 4 feet 9 inches= 122 inches, which x 2, for the oppoſite wheels 244; which x6 for the breadth of the felly=1464 inches for the ſurface the wheels reſt on; this x8, the denſity of the ſoil 11712lb. or 5 tons, 4cwts. 2qrs. 8lb. the weight which the wheels would ſupport without ſinking more than one foot below the ſurface, and is equal to about four load of green Oak, allowing ſixty pound to the ſquare foot.

The advantage theſe Wheels have over the common ones is evident, by inſpecting the figure A B C D, as in order to gain a ſurface of 1464 inches, the wheels C and D, muſt ſink to c c and d d, near two feet below the ſurface; by which the leverage x c and y d of the ſpokes, becomes ſo ſmall in the latter as to require a very great

great addition of force to move the Carriage forward.

Four load, or two hundred feet, is a heavy draft for ſix horſes on common roads and Carriages; but the load being ſuſpended under the axis, as ſhewn by the model, the horſes drawing by the timber inſtead of the ſhafts, gives a great advantage: the center of gravity being continually urged out of its perpendicular direction by the uniform motion of the horſes, the wheels will of courſe have a continual tendency forwards, in order to recover it.

It is preſumed that this Carriage will carry five tons and a quarter on any ground which will ſupport the horſes; where it is too ſoft for them to ſtand, it will likewiſe be too ſoft to ſupport the wheels; in that caſe, the troughs or ſlids which ac-

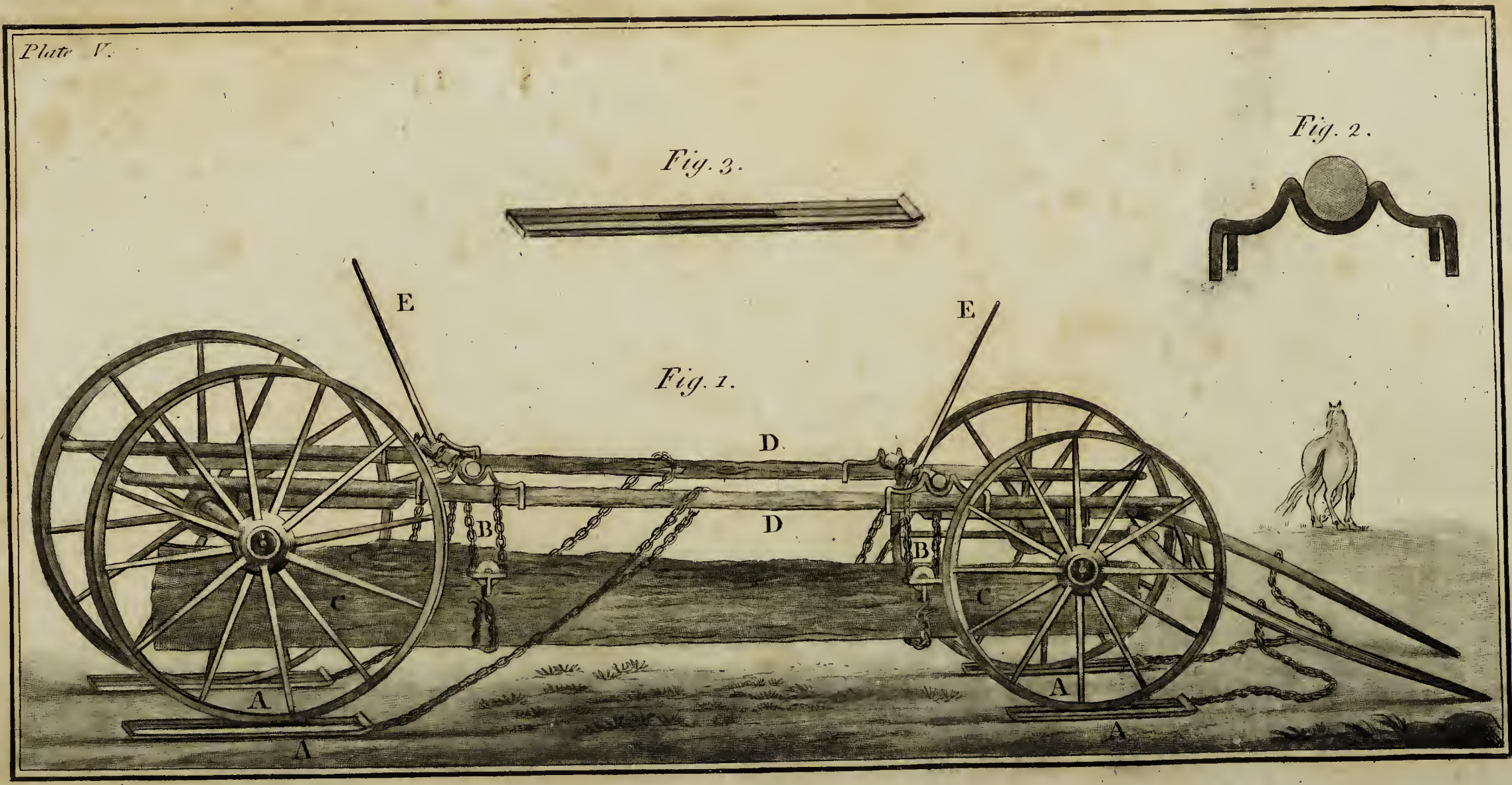
com-

company the Carriage, are to be placed under the wheels, which being twenty-four inches wide conſequently increaſe the ſurface on which the load will then reſt, four times, and the preſſure being in an inverſe proportion to the ſurface, will then be reduced to two pound to the inch; and the ſoil being ſo very ſoft, the troughs or ſlids will move eaſier than a Carriage would on hard roads: the carriage may then be drawn by means of a rope paſſing over the ſhieve of a notch block, tailed to any neighbouring tree or ſtump, and horſes may be placed in any direction, or at any diſtance, as the ground will admit them to work on. The method of loading this Carriage, will likewiſe have the advantage of the common Gin, on ſoft ground, in proportion to the difference of ſurface between the four wheels and the three legs of the Gin.

As many inconveniencies occur at timber-carting, it may not be amiſs to mention one wherein the new method will have a great advantage: Suppoſe a Carriage is loaded and going on, the wheels ſuddenly ſink into the ſoil ſo far as for the load to hang; by the common method, there is no reſource but to get more horſes and pull it out by main ſtrength, becauſe the Gin will not hoiſt it on ſuch ſoft ground: But by the new method, it is only neceſſary to looſe the leavers and lower the timber quite to the ground, draw off the wheels and place the troughs or ſlids under them, hoiſt up the load, and go on till off the bog. By the ſame mode of reaſoning, it may be ſuggeſted perhaps, that nine inch wheels would be preferable; but it ſhould be recollected, that ſix inch ones will be lighter, and therefore better for common uſe.

DESCRIP-

Plate V.



Mr. Besant's Carriage for conveying Timber on soft or boggy Land.

DESCRIPTION OF THE PLATE OF MR BESANT'S MACHINE FOR TRANSPORTING TIMBER, OR OTHER HEAVY MATERIALS OVER SOFT OR CLAYEY LAND.

A.A.A.A. Plate 5. The Troughs or Slids which are hung to the Carriage by Chains, as expreſſed in the Plate, and are occaſionally to be uſed when the ſoil is too ſoft to do without them; in ſuch caſe, the Horſe is to be taken from between the ſhafts, and placed at a diſtance, and the Carriage drawn by a rope either in a ſtraight line or paſſing over a notch-block, as mentioned in page 207. B. B. the Chains and Pullies by which the Timber or other heavy Materials CC, are ſuſpended from the Rollers which lie on the poles D D. E E, Handſpikes in the eyes or mortiſſes of the Rollers, by which the

the load is raiſed or lowered. Theſe Rollers work on Irons placed upon the Poles, and moveable thereon according to the diſtance required from the nature and length of the load. The form of theſe Irons, with the end of a Roller, is ſhewn on a larger ſcale at Fig. 2. Plate 5.

Fig. 3. one of the Troughs or Slids, detached from the Carriage.

REWARDS

REWARDS

ADJUDGED BY THE

SOCIETY,

IN

M, DCC, LXXXVII.

REWARDS

BESTOWED IN

AGRICULTURE.

TO the Rev. HENRY BATE DUDLEY, of Bradwell juxta Mare, in Eſſex, for having gained forty-five acres, one rood and twenty-five poles of Land from the Sea, the SILVER MEDAL, ſee page 56.

To the Rev. J. R. LLOYD of Aſton, in the county of Salop, for having planted ſixty-four thouſand five hundred and forty Oak Plants, on fifteen acres and three quarters of land, The GOLD MEDAL, ſee page 38.

To THOMAS WHITE, Eſq; for having planted on his Eſtate at Butsfield in the pariſh of Lanchester, Durham, fifty thouſand Oak trees, The SILVER MEDAL, ſee page 46.

CHEMISTRY.

To HELLENUS SCOTT, Eſq; of Bombay, for having ſent to the Society, a quantity of Indian native foſſil Alkali, The SILVER MEDAL, ſee page 120.

POLITE AND LIBERAL ARTS.

Claſs 121. HONORARY PREMIUM, To Mr ROBERT MULLER, St James's Palace, The SILVER

VER MEDAL. Subject, THREE HEADS, after Piazzetti.

Class 122. HONORARY PREMIUM, To MISS ANN WHITEHEAD, Basinghall Street, The GOLD MEDAL. Subject, THE HEAD SIR KENELM DIGBY, after Vandyke.

Class 123. HONORARY PREMIUM, To MISS CATHARINE CHARLOTTE RAPER, Cheyney Walk, Chelsea; THE SILVER MEDAL. Subject, FOUR HEADS, after Sir Joshua Reynolds.

To MISS MARGARET ELIZA CUNLIFFE, of New Norfolk Street, THE LESSER

SILVER PALLET. Subject, FIGURES BY TORCH LIGHT, after Sir Joshua Reynolds.

TO MR THEODORE ELLIOT, THREE GUNIEAS, for producing Two PICTURES OF SHIPPING.

TO MR HORWELL, New Store Street, THE GREATER SILVER PALLET, for a piece of Sculpture. Subject, A recumbent Figure of PSYCHE, on a Tablet, for a Chimney Piece.

Class 141. DRAWING OF OUTLINES, TO MR JAMES GODBY, aged 15, Berwick Street, Oxford Road; THE LESSER SILVER PALLET.

This

This Candidate not having complied with the terms of the advertiſement; the Figures in his Drawing not being of the ſize required, could not be admitted a Claimant for the Premium; but the Leſſer Silver Pallet was voted to him as a Bounty, in conſideration of the great merit of the performance.

To Mr William Yates, of Liverpool, the Gold Medal for his Survey of Lancaſhire, ſee page 153.

In the year 1784, the following Premiums were adjudged in the Claſs of Polite Arts, but omitted in the Account of Rewards beſtowed that year.

Claſs 147. Historical Drawing,
To Mr Thomas Procter,
No.

No. 144, Strand, THE GOLD PALLET. Subject, The Prophet denouncing Judgment againſt the Prieſts and the Altar of the Golden Calf, at Bethel; 1 Kings xiii. 4, 5.

Claſs 147. HISTORICAL DRAWING, To Mr JOHN HOWES, No 13, Fleet Street; THE GREATER SILVER PALLET. Subject, The Queen of Sheba viſiting Solomon.

MANUFACTURES.

Claſs 151. To Mr JOHN BATES, Wycomb Marſh, Bucks, THE GOLD MEDAL, for Paper for taking Impreſſions from Copper Plates ſee page 167.

MECHANICKS.

To Mr MATTHEW HILL, of Scarborough, FIVE GUINEAS, for his Invention of a Machine for meaſuring Angles, ſee page 183.

To Mr JOHN SMEATON, THE SILVER MEDAL, for his Deſcription and Drawing of Mr Weſtgarth's Hydraulic Machine: ſee Vol. V. page 193.

To Mr ABRAHAM DARBY THE GOLD MEDAL, for preſenting a Model of the Iron Bridge over the Severn, near Coalbrook Dale.

Claſs 165. To Mr JOHN BESANT, Mill Bank, Weſtminſter, TWENTY GUINEAS, for a Machine for tranſporting Timber and other heavy Materials over ſoft or clayey Land, ſee page 202.

MISCELLANEOUS MATTERS.

To VALENTINE GREEN, Eſq; F. A. S. THE GOLD MEDAL, for Eminent Services.

PRESENTS

RECEIVED BY THE

SOCIETY,

In the YEAR MDCCLXXXVII.

With the Names of the DONORS.

BOOKS.

ROYAL SOCIETY.

Philoſophical Tranſactions for 1787, Part I, and II.

A General Index to the Philoſophical Tranſactions, from the Iſt, to the end of the LXXth Volume.

SAMUEL

SAMUEL EWER, ESQ.

Monument élevé a la Gloire de Pierre le Grand, ou relation des Travaux, et des Moyens Mechaniques, Qui ont été employés, pour tranſporter à Peterſbourg, un Rocher de trois Millions peſant, deſtiné a ſervir de Baſe a la Statue équeſtre de cet Empereur.

MONS. L. A. DAMBOURNEY.

Recueil de procedés et d' Experiences ſur les Teintures ſolides, &c. preſented by the Author.

JOHN COAKLEY LETTSOM, M. D.

Journal of a Voyage to the South Seas, in His Majeſty's ſhip Endeavour; By the late Sydney Parkinſon: with Remarks on the Preface, by Dr Fothergill, and an Appendix containing an Account of

of the Voyages of Commodore Byron, Captain Wallis, Captain Carteret, &c.

Memoirs of John Fothergill, M. D. &c. by John Coakley Lettſom; with Memoirs of William Cuming, M. D. George Cleghorn, M. D. and Peter Collinſon, F. R. and A. S.

The Works of John Fothergill, M.D. with ſome Account of his Life, By John Coakley Lettſom.

Hiſtory of the Origin of Medecine; an Oration delivered at the Anniverſary Meeting of the Medical Society of London, By John Coakley Lettſom, M. D. F. R. and A. S.

Mr WILLIAM GREEN.

New Copies and Specimens of Writing in all the Hands uſed in Great Britain; written

written in Engliſh, Latin, Greek and French; and intended for the uſe of ſchools: preſented by Mr William Green, Maſter of the Academy at Croydon.

Mr Samuel Hooper.

Seven Volumes and the Supplement, of Antiquities of England and Wales; By Francis Groſe, Eſq.

A Treatiſe on Ancient Armour and Weapons, illuſtrated by Plates; taken from the original Armour: By Francis Groſe, Eſq.

A Provincial Gloſſary; By Francis Groſe, Eſq.

A Treatiſe on an Inland Navigation from London to Norwich; By John Phillips.

The

The Hiſtory of Dover Caſtle, by the Rev. William Darell.

GEORGE STACKPOOLE, ESQ.

The Hiſtory of Wales, written originally in Britiſh, by Caradoc of Lhancarvan; to which is added, A Deſcription of Wales, by Sir John Price.

VALENTINE GREEN, ESQ.

Acta Hiſtorica Reginarum Angliæ.

MR JOHN WHITEHURST, F. R. S.

An attempt towards obtaining invariable Meaſures of Length, Capacity and Weight from the Menſuration of Time; By John Whitehurſt, F. R. S.

GEORGE WINTER, ESQ.

A New Compendious Syſtem of Huſbandry, &c. By George Winter, Eſq.

MEDICAL SOCIETY.

Memoirs of the Medical Society inſtituted at London, 1773.

TRUSTEES OF THE BRITISH MUSEUM.

Catalogus Bibliothecæ Muſei Britanici, Vol. I, and II.

ARTHUR YOUNG, ESQ. F. R S.

The VIth and VIIth Volumes of Annals of Agriculture. By Arthur Young, Eſq.

WILLIAM BEATSON, ESQ.

A Deſcription of a Net for deſtroying the Turnep Fly, &c. By William Beatſon, Eſq.

PICTURES

PICTURES, PRINTS AND MAPS.

MISS EMMA JANE GREENLAND.

Portrait of a Lady, painted by Miſs Greenland, after the ancient Greek manner: ſee Vol. V. page 103.

SIR JOHN SINCLAIR, BART.

A Sketch of a Journey made by Sir John Sinclair, in the Years 1786, and 1787.

MR. JOHN SMEATON, F.R.S.

Two Drawings and a Deſcription of Mr Weſtgarth's Hydraulic Machine: ſee Vol. V. page 179.

GEORGE STACKPOOLE, ESQ.

A Print of Sir Richard Stackpoole, formerly of Pembrokeſhire.

HENRY PELHAM, Esq.

A Map of the County of Clare.

Mr WILKINSON, Printſeller, Cornhill.

A Print of the Iron Bridge over the Severn, near Coalbrook Dale.

Mr SAMUEL MORE.

Two Prints; the one a Perſpective View: the other, a Geometrical Plan and Elevation of the Iron Bridge over the Severn, near Coalbrook Dale.

MISCELLANEOUS MATTERS.

CHRISTOPHER POTTER, Esq.

Forty-eight Mole Skins.

JOSHUA STEELE, Esq.

A Caſk of Cotton Roots.

SIR

SIR JOHN ANSTRUTHER, BART.

A Model of a Drill Plough, with a printed Deſcription and Plan.

Mr ABRAHAM DARBY.

A Model of the Caſt Iron Bridge over the Severn, near Coalbrook Dale.

Mr JOHN BARTON.

A Model of a Machine for ſpinning Cotton, Flax, &c.

THOMAS BOOTHBY PARKYNS, ESQ.

A Model of a Cabbage and Turnep Slicer.

Mr Profeſſor Ross, of Aberdeen.

A Bag of Turnep-rooted Cabbage-ſeed.

WILLIAM WALCOTT, ESQ.

A Bag of Turnep-rooted Cabbage ſeed, and ſome Seed of the Racine de Diſette.

A CATALOGUE

OF THE

MODELS AND MACHINES

Received ſince the Publication of the Fifth Volume of the Society's Tranſactions, with the Numbers, as they are arranged in the Claſs to which they belong.

AGRICULTURE. CLASS I.

LXXVI. A Model of a Drill Plough for ſowing all kind of Grain; preſented by Sir John Anſtruther, Bart.

LXXVII.

LXXVII. A Model of a Cabbage and Turnep Slicer, preſented by Thomas Boothby Parkyns, Eſq.

Manufactures. Class III.

XXV. A Model of a Machine for ſpinning Cotton, &c. preſented by Mr John Barton.

Mechanicks. Class IV.

CIX. A Model of a Machine for tranſporting Timber or other heavy Materials over ſoft or clayey Land; by Mr John Beſant, for which a premium of twenty Guineas was adjudged to him.

CX. A Model of the Iron Bridge built over the Severn, near Coalbrook Dale; preſented by Mr Abraham Darby, for which the Gold Medal was preſented to him.

CXI. A Sector and Depthening Tool for Clock and Watch-Makers, by Mr Joſeph Ridley; for which a bounty of twenty Guineas was voted to him.

CXII. A Pocket Memorandum Book for the uſe of Blind Perſons, by Mr Robert Bromley; for which the Silver Medal was preſented to him.

A LIST

OF THE

OFFICERS OF THE SOCIETY,

And CHAIRMEN

OF THE SEVERAL

COMMITTEES.

PRESIDENT.

** ROBERT Lord Romney, LL. D. F.R.S.

VICE-PRESIDENTS.

** Charles Duke of Richmond, &c. F.R.S.

** Hugh Duke of Northumberland, K. G. F.R.S.

** George

MANUFACTURES.

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Mr John Baynes.

MECHANICKS.

Joſeph Hurlock, Eſq; F. R. S.
* Samuel Ewer, Eſq;

CHEMISTRY.

Sir John Ingilby, Bart.
Mr Edward Kendrick.

COLONIES AND TRADE.

Edward Webſter, Eſq;
Mr Joſeph Pourcin.

MISCELLANEOUS MATTERS.

Mr Joſeph Jacob,
Mr Abraham Hall.

PRE-

PREMIUMS

OFFERED BY THE

SOCIETY

FOR THE ENCOURAGEMENT OF

ARTS, MANUFACTURES

AND

COMMERCE,

IN THE YEAR,

M DCC LXXXVIII.

TO THE

PUBLICK.

ADELPHI BUILDINGS, *April* 10, 1788.

THE chief objects of the attention of the Society for the Encouragement of Arts, Manufactures, and Commerce, in the application of their Rewards, are Ingenuity in the ſeveral branches of the Polite and Liberal Arts; uſeful Diſcoveries and Improvements in AGRICULTURE, MANUFACTURES, MECHANICKS, and CHEMISTRY, or the laying open any ſuch to the Publick; and in general, all ſuch uſeful Inventions, Diſcoveries, or Improvements (though not mentioned in the Book of Premiums) as may appear to have a tendency to the advantage of Trade and Commerce; the Society therefore, in purſuance of their plan, propoſe to beſtow the following Premiums:

Premiums

Premiums for Planting and Huſbandry.

1. ACORNS. For having ſet, agreeably to the conditions publiſhed in the liſt of premiums laſt year, between the firſt of October, 1787, and the firſt of April, 1788, the greateſt quantity of ſtrong land, not leſs than ten acres with acorns, and ſeeds or cuttings of other trees, and for the effectually fencing and preſerving the ſame, in order to raiſe timber and underwood; the gold medal.

2. For the ſecond greateſt quantity of land, not leſs than five acres, ſown or ſet agreeably to the above conditions; the ſilver medal.

CERTIFICATES of ſetting or ſowing agreeably to the above conditions, and that there are not fewer than three hundred young Oaks on each acre; to be delivered

to

to the Society, on or before the firſt Tueſday in November, 1788.

3, 4. The ſame premiums are extended one year further.

CERTIFICATES to be produced on or before the firſt Tueſday in November, 1789.

5, 6. The ſame premiums are extended one year further.

CERTIFICATES to be produced on or before the firſt Tueſday in November 1790.

7, 8. The ſame premiums are extended one year further.

CERTIFICATES to be produced on or before the firſt Tueſday in November 1791.

9. RAISING OAKS. To the perſon who ſhall have raiſed the greateſt number of Oaks, not fewer than five thouſand, either from young plants, or from acorns, in woods, parks, or foreſts, that have long been under timber, and effectually fenced and preſerved the ſame, in order to ſecure a ſucceſſion of oak timber in this kingdom; the gold medal.

10. For the next greateſt quantity, not fewer than three thouſand; the ſilver medal.

CERTIFICATES and Accounts to be produced on or before the firſt Tueſday in January, 1789.

11, 12. The ſame premiums are extended one year further.

CERTIFICATES to be produced on or before the firſt Tueſday in January, 1790.

13, 14,

13, 14. The ſame premiums are extended one year further.

CERTIFICATES that there were on the land, upon the firſt of November 1790, at leaſt the number of young Oak trees required, in a thriving condition effectually fenced and preſerved, with an account of the methods purſued in making and managing the plantation; to be produced to the Society on or before the firſt Tueſday in January, 1791.

15. OBSERVATIONS ON OAK. To the perſon who ſhall furniſh the beſt obſervations and experiments on the various obſtructions to the growth of Oak trees, with appoſite remedies for the ſame; and ſhall alſo aſcertain thoſe appearances on Oak trees, which may ſerve to ſhew them to have arrived at the proper period, and to be in a fit ſtate to be

felled for the purpoſes of ſhip building, and other uſes, the gold medal.

The Accounts to be produced to the Society, on or before the third Tueſday in December 1789.

16. CHESNUTS. For having ſown or ſet agreeably to the conditions publiſhed in the liſt of premiums laſt year, between the firſt of October, 1787, and the firſt of April 1788, the greateſt quantity of dry loamy land, not leſs than ſix acres, with a mixture of Spaniſh Cheſnuts and the ſeeds or cuttings of other trees adapted to ſuch ſoil, and for effectually fencing and preſerving the ſame, in order to raiſe timber; the gold medal.

17. For the ſecond greateſt quantity not leſs than four acres; the ſilver medal.

CERTIFICATES of ſowing or ſetting agreeably to the above conditions, and that there

there are not fewer than three hundred Chefnut plants in a thriving ſtate on each acre, to be delivered to the Society, on or before the firſt Tueſday in November 1788.

18, 19. The ſame premiums are extended one year further.

CERTIFICATES to be delivered on or before the firſt Tueſday in November 1789.

20, 21. The ſame premiums are extended one year further.

CERTIFICATES to be delivered on or before the firſt Tueſday in November 1790.

22, 23. The ſame premiums are extended one year further.

CERTIFICATES to be delivered on or before the firſt Tueſday in November 1791.

24. ELM. For having planted the greateſt number of the Engliſh Elm, not

leſs than eight thouſand, between the twenty-fourth of June, 1787, and the twenty-fourth of June, 1788, and for the having effectually fenced and preſerved the ſame, in order to raiſe timber; the gold medal.

25. For the ſecond greateſt number, not leſs than five thouſand; the ſilver medal.

26. For the third greateſt number, not leſs than four thouſand; the ſilver medal.

CERTIFICATES of the having planted agreeably to the above conditions, and ſpecifying the diſtance of the trees, muſt be delivered to the Society, on or before the firſt Tueſday in November, 1788.

27, 28, 29. The ſame premiums are extended one year further.

CERTIFICATES of the having planted agreeably to the above conditions, that the plants

plants were in a healthy and thriving ſtate two years at leaſt, after making the plantation, and ſpecifying the diſtance of the plants; to be delivered to the Society, on or before the firſt Tueſday in November, 1792.

30. LARCH. For having planted out, from the twenty-fourth of June 1787, to the twenty-fourth of June 1788, at a diſtance not more than five feet, the greateſt number of Larch-trees, not leſs than five thouſand; the plants to be between two and four years old when planted out; and for having effectually fenced and preſerved the ſame, in order to raiſe timber; the gold medal.

31. For the ſecond greateſt number, not leſs than three thouſand; the ſilver medal.

CERTIFICATES of having planted agreeably to the above conditions, to be

delivered on or before the laſt Tueſday in November 1788.

32. LARCH. For having planted out between the twenty-fourth of June 1789, and the twenty-fourth of June 1790, in a mixed plantation of foreſt trees, the greateſt number of Larch trees not fewer than five thouſand, and for having effectually fenced and preſerved the ſame in order to raiſe timber; the gold medal.

33. For the next greateſt number, not fewer than three thouſand; the ſilver medal.

CERTIFICATES of the number of plants, that they were in a healthy and thriving ſtate, two years at leaſt, after they were planted out, with a general account of the methods uſed in making the plantation; to be delivered to the Society

Society on or before the laſt Tueſday in December 1793.

34. SILVER FIR. For having planted out between the twenty-fourth of June 1789, and the twenty-fourth of June, 1790, in a mixed plantation of foreſt-trees, the greateſt number of Silver Firs, not fewer than two thouſand, and for having effectually fenced and preſerved the ſame in order to raiſe timber; the gold medal.

35. For the next greateſt number not fewer than one thouſand; the ſilver medal.

CERTIFICATES of the number of plants, that they were in a healthy and thriving ſtate, two years at leaſt, after they were planted out, with a general account of the methods uſed in making the plantation, to be delivered to the Society on or before the laſt Tueſday in December 1793.

36. HUN-

36. HUNTINGDON WILLOW. For the greateſt number of acres, not leſs than three, planted in the year, 1788, with Huntingdon Willows; the number of cuttings to be at leaſt one thouſand on each acre, properly fenced and ſecured; the gold medal.

CERTIFICATES to be produced on or before the laſt Tueſday in December, 1789.

37. UPLAND OR RED WILLOW. For the greateſt number of acres, not leſs than three, planted before the end of April 1788, with Upland or Red Willow, properly fenced and ſecured, the number of plants on each acre to be at leaſt twelve hundred; the gold medal.

CERTIFICATES to be produced on or before the laſt Tueſday in April, 1789.

It is well known that this ſpecies of Willow thrives well on dry ſandy land.

38. The

38. The ſame premium is extended one year further.

CERTIFICATES of the number of plants, and that they were in a thriving ſtate at the time of ſigning ſuch certificates; to be produced to the Society on or before the laſt Tueſday in April 1790.

39. ALDER. For the greateſt number of acres, not leſs than ſix, planted in the year 1787, with Alders, to be at leaſt one thouſand on each acre, properly fenced and ſecured.

CERTIFICATES to be produced to the Society, on or before the laſt Tueſday in December, 1788, of the ſaid planting, and that the trees were then growing on the land; the gold medal.

40. ALDER. For having planted in the year 1789, the greateſt number of Alders not leſs than three thouſand on an eſtate the property of one perſon; the gold medal.

CER-

CERTIFICATES of the number of the plants, and that they were in a thriving ſtate, two years at leaſt, after being planted; to be delivered to the Society, on or before the laſt Tueſday in December 1792.

41. ASH. For having planted the greateſt number of acres not leſs than ſix, in the year 1787, with Aſh for timber; the plants to be at leaſt two years old, properly ſecured and fenced; the number of plants on each acre to be at leaſt twelve hundred; the gold medal.

42. For the next greateſt number of acres, not leſs than four; the ſilver medal.

CERTIFICATES to be delivered on or before the ſecond Tueſday in December, 1788.

43. ASH. For having ſown or ſet in the year 1788, the greateſt quantity of land,

land, not leſs than ſix acres, with Aſh for timber, intermixed with the ſeeds, cuttings or plants of ſuch other trees as are adapted to the ſoil; the gold medal.

44. For the next greateſt quantity not leſs than four acres; the ſilver medal.

CERTIFICATES of the ſowing or ſetting agreeably to the above conditions, and that there are not fewer than one hundred Aſh plants on each acre; to be delivered to the Society on or before the laſt Tueſday in December, 1789.

45, 46. The ſame premiums are extended one year further.

CERTIFICATES to be delivered on or before the laſt Tueſday in December 1790.

47. ASH. For having ſown, or ſet in the year 1790, the greateſt quantity of land, not leſs than ſix acres, with Aſh for

for timber, intermixed with ſeeds, cuttings or plants of ſuch other trees as are adapted to the ſoil; the gold medal.

48. For the next greateſt quantity, not leſs than four acres; the ſilver medal.

CERTIFICATES of the ſowing or ſetting agreeably to the above conditions, that there are not fewer than one hundred Aſh plants on each acre, in a thriving and healthy condition, two years at leaſt, after the ſowing or ſetting, with a general account of the methods uſed in making the plantation; to be delivered to the Society on or before the laſt Tueſday in December, 1793.

49. MIXED TIMBER TREES. To the perſon who ſhall have incloſed, planted or ſown the greateſt number of acres, not leſs than ten, with the beſt ſorts of Foreſt trees, for timber, between the firſt of

of October, 1784, and the first of May, 1786; the gold medal.

An Account of the methods used in making the plantations, and of the nature of the soil, together with proper Certificates that the trees were in a thriving and healthy state, two years, at least, after making the plantation, to be delivered to the Society on or before the first Tuesday in November, 1788.

50. The same premium is extended one year further.

The Accounts and Certificates to be delivered to the Society on or before the first Tuesday in November, 1789.

51. The same premium is extended one year further.

The Accounts and Certificates to be delivered to the Society on or before the first Tuesday in November, 1790.

52. The

52. The ſame premium is extended one year further.

The Accounts and Certificates to be delivered to the Society on or before the firſt Tueſday in November, 1791.

53. MULBERRY CUTTINGS. For having raiſed the greateſt number of white or black Mulberry Tees, for feeding Silk Worms, not leſs than three hundred, from cuttings in the year 1785, the gold medal.

CERTIFICATES of the raiſing and growth, with the manner of culture, and that the plants were growing in September, 1788, to be produced on or before the firſt Tueſday in November, 1788,

54. MULBERRY CUTTINGS. To the perſon who ſhall have formed in the year 1785, the largeſt plantation, not leſs than

than one acre of Mulberry Cuttings for the purpoſe of feeding Silk Worms; the gold medal.

CERTIFICATES of the quantity of land and the method of culture, that the Mulberry Plants are not more than three feet aſunder, and that they were growing in the month of September, 1788; to be produced on or before the firſt Tueſday in December, 1788.

It is propoſed that this Plantation be continually kept in a low ſtate, to the intent that the gathering the leaves may always be within the reach of women and children.

55. MULBERRY CUTTINGS OR TREES. For having planted the greateſt number of white or black Mulberry Cuttings or Trees, not fewer than three

hundred, in the year 1787, for the purpoſe of feeding Silk Worms; the gold medal, or twenty pounds.

56. For the ſecond greateſt quantity, not fewer than one hundred and fifty; the ſilver medal, or ten pounds.

CERTIFICATES of ſuch planting, with the manner of culture, and that the trees were growing in the month of July, 1789, to be produced to the Society on or before the firſt Tueſday in November, 1789.

57. The ſame premiums are extended one year further.

CERTIFICATES to be produced on or before the firſt Tueſday in November, 1790.

58. MULBERRY TREES IN HEDGE ROWS. To the perſon who ſhall plant in the year 1788, the greateſt number,

number, not fewer than one hundred layers, of the black or white Mulberry, in Hedge Rows, at a diſtance not leſs than twelve feet from each other; ten pounds.

59. For the next greateſt number not fewer than fifty; five pounds.

CERTIFICATES of the number of plants, and that the trees were then in a growing ſtate; to be delivered to the Society, on or before the firſt Tueſday in October, 1789.

*** *The Candidates for planting all kinds of Trees, are to certify, that the reſpective Plantations are properly fenced and ſecured, and particularly to ſtate the Condition the Plants were in at the time of ſigning ſuch Certificates.*

Any information which the Candidates for the foregoing Premiums may chuſe to commu-

nicate, relative to the methods made uſe of in forming the Plantation, or promoting the growth of the ſeveral Trees, or any other obſervations that may have occurred on the ſubject, will be thankfully received.

60. TREES FOR USE WHEN EXPOSED TO THE WEATHER. To the perſon who ſhall ſend the moſt ſatisfactory account, verified by experiments, to determine which of the following trees is of the greateſt utility for timber or poles, for uſe, when expoſed to the weather; viz.

Larch,	Black Poplar,
Aſh,	Spaniſh Cheſnut,
Willow,	Alder,
Beech,	Silver Fir,
Lombardy Poplar;	

the gold medal,

The

The Accounts to be produced on or before the ſecond Tueſday in December, 1788.

61. The ſame premium is extended one year further.

The Accounts to be produced on or before the ſecond Tueſday in December, 1789.

62. PLANTING BOGGY OR MORASSY SOILS. For an account of the beſt ſet of experiments ſent by the planter or his repreſentative, to aſcertain the comparative advantages of planting boggy or moraſſy ſoils, with White Poplar, Black Poplar, Lombardy Poplar, and Willow; the gold medal.

It is required that not leſs than half an acre be planted with each, and the plants to be not more than four feet aſunder.

It is alſo required that the plantation ſtand fourteen years, at the end of which, to be all cut down and meaſured, or accurately meaſured ſtanding; the Certificates of the meaſure and value, and that the whole is properly fenced and ſecured, to be produced on or before the firſt Tueſday in January, 1792.

N. B. Any information relating to the ſtate of the plantation, if ſent to the Society, between the time of planting and claiming the premium, will be thankfully received.

63. The ſame premium is extended one year further.

CERTIFICATES to be produced on or before the firſt Tueſday in January 1793.

64. The ſame premium is extended one year further.

CER-

CERTIFICATES to be produced on or before the firſt Tueſday in January, 1794.

65. The ſame premium is extended to the year 1796.

CERTIFICATES to be produced on or before the firſt Tueſday in January, 1797.

66. The ſame premium is extended one year further.

CERTIFICATES to be produced on or before the firſt Tueſday in January, 1798.

67. COMPARATIVE CULTURE OF WHEAT. For the beſt ſet of experiments made on not leſs than eight acres, four of which to be ſown broad-caſt and four drilled, to aſcertain whether it is moſt advantageous to cultivate Wheat, by ſowing it in the common broad-caſt way, or by drilling it in equi-diſtant rows, hoeing the intervals; the gold medal.

It is required that an account of the nature and condition of the land on which the experiments are made, together with an account of the produce of the corn, be produced to the Society on or before the firſt Tueſday in February, 1789.

68. The ſame premium is extended one year further.

The Accounts to be produced to the Society on or before the firſt Tueſday in February, 1790.

69. COMPARATIVE CULTURE OF WHEAT. For the beſt ſet of experiments made on not leſs than eight acres of land, four of which to be ſown broad-caſt and four dibbled, to aſcertain whether it is moſt advantageous to cultivate Wheat, by ſowing it in the common broad-caſt way, or by dibbling it in equidiſtant rows, hoeing the intervals; the gold medal.

It

It is required that an account of the nature and condition of the land on which the experiments are made, together with an account of the produce of the corn, be produced to the Society on or before the firſt Tueſday in February, 1789.

70. The ſame premium is extended one year further. The Accounts to be produced to the Society on or before the firſt Tueſday in February, 1790.

71. BEANS AND WHEAT. To the perſon who ſhall have planted or drilled between the firſt of December, 1786, and the firſt of March 1787, the greateſt quantity of land, not leſs than ten acres, with Beans, and ſhall ſow the ſame land with Wheat in the ſame year, 1787; ten guineas.

It is required that an account of the ſort and quantity of Beans, the time of planting

planting or drilling, and of reaping or mowing them, the produce per acre threſhed, the application of the ſtraw, the expenſe of planting or drilling, hand or horſe-hoeing, the diſtance of rows and the quality of the ſoil, together with Certificates of the number of acres, and that the land was actually ſown with Wheat in the year 1787, to be produced on or before the firſt Tueſday in November, 1788.

N. B. The Society have been informed that Beans may be drilled or planted ſo early as the month of December, from whence may be derived the advantage of an early harveſt, in which caſe, the ſtraw will be far more valuable than that from a later planting or drilling.

72. The ſame premium is extended one year further. The Accounts to be produced

produced on or before the firſt Tueſday in November, 1789.

73. TURNEPS. For the beſt account of experiments made on at leaſt ſix acres of land, to determine the comparative advantages of the drill, or broad-caſt method in the cultivation of Turneps; the gold medal.

The Accounts to be delivered in, on or before the third Tueſday in April, 1789.

74. The ſame premium is extended one year further.

The Accounts to be delivered on or before the third Tueſday in April, 1790.

75. GREEN VEGETABLE FOOD. For the beſt account confirmed by experiments, of the vegetable Food, (Cabbages and

and Turneps excepted) growing in the months of March and April, that will moſt encreaſe the milk in Mares, Cows, and Ewes, at that ſeaſon; provided ſuch food can be cultivated at an expenſe that will admit of its being applied to the above purpoſes; the gold medal.

CERTIFICATES to be produced on or before the ſecond Tueſday in November, 1788.

76. The ſame premium is extended one year further.

CERTIFICATES to be produced on or before the ſecond Tueſday in November, 1789.

77. COMPARATIVE CULTURE OF THE TURNEP ROOTED CABBAGE. To the perſon who ſhall produce to the Society, the beſt account of the

the moſt ſatisfactory experiments, made on at leaſt four acres of land, to aſcertain the comparative advantages of the culture of the Turnep-rooted Cabbage, by ſowing it broad-caſt, and hoeing out the plants as is practiſed with the common Turnep, or by ſowing the Seed in Nurſeries and tranſplanting the plants at proper diſtances, hoeing the intervals; the ſilver medal, or ten pounds.

It is required that at leaſt two acres be cultivated in each manner, and Certificates of the culture, with an account of the ſoil, expenſe and produce of each ſeparately, be produced on or before the firſt Tueſday in October, 1791.

78. The ſame premium is extended one year further.

CER-

CERTIFICATES and Accounts to be produced on or before the firſt Tueſday in October, 1792.

79. TURNEP-ROOTED CABBAGE. For having raiſed and duly cultivated Turnep-rooted Cabbage, in the year 1788, for the feeding Cattle or Sheep, on the greateſt number of acres, not leſs than ten, and giving an account of the ſoil, culture, time and manner of feeding off, produce, and the effects on Cattle or Sheep fed with it; the gold medal.

80. For the next greateſt number of acres not leſs than five; the ſilver medal.

CERTIFICATES of the quantity of land, with the accounts, to be produced on or before the laſt Tueſday in October, 1789.

81. The ſame premium is extended one year further.

CER-

CERTIFICATES to be produced on or before the laſt Tueſday in October, 1790.

82. CURE OF THE CURLED POTATOE. To the perſon who ſhall diſcover to the Society the nature and cauſe of the diſeaſe in the Potatoe-plant called THE CURLED POTATOE, and point out an effectual cure, the whole verified by repeated and ſatisfactory experiments; the gold medal, or thirty pounds.

The Accounts to be produced to the Society, on or before the third Tueſday in November, 1789.

83. POTATOES FOR FEEDING CATTLE AND SHEEP. To the perſon who ſhall in the year 1788, cultivate the greateſt quantity of land, not leſs than four acres, with Potatoes, for the ſole purpoſe of feeding Cattle and Sheep, the gold medal, or twenty guineas.

CER-

CERTIFICATES with ſatisfactory Accounts of the expenſe and manner of cultivating the Potatoes, and the application of them to the above purpoſes, and the ſucceſs that has attended the uſe of them, to be delivered to the Society, on or before the ſecond Tueſday in November, 1789.

84. The ſame premium is extended one year further.

CERTIFICATES to be delivered on or before the ſecond Tueſday in November, 1790.

N. B. Should any Gentleman have already cultivated Potatoes for the purpoſes mentioned in the above advertiſement, any information from him on the ſubject, will be thankfully received by the Society.

85. CUL-

85. CULTIVATING ROOTS AND HERBAGE FOR FEEDING SHEEP AND BLACK CATTLE. For the moſt ſatisfactory experiments made between Michaelmas, 1787, and the firſt of May, 1788, in order to aſcertain which of the following plants can be cultivated and houſed, or otherwiſe ſecured for winter fodder, to the greateſt advantage, viz.

Turnep-rooted Cabbage,	Carrots,
Turnep Cabbage,	Parſneps,
Turneps,	Potatoes.

The Accounts to be produced on or before the firſt Tueſday in November, 1788; the gold medal.

It is required that the above roots be taken off the land by the laſt day of October, 1787; that a Crop of Wheat may be ſown in the ſame ground, and the particulars of the ſowing and planting, tak-

ing up, produce, preſerving, and application to the feeding Sheep and Black Cattle, be ſpecified. The comparative experiments muſt be made between two or more of any of the above mentioned plants, and not leſs than two acres be cultivated with each particular kind of plant.

N. B. Great advantage will ariſe to the Farmer occupying land in the neighbourhood of extenſive commons, from the conveniency of keeping large flocks of Sheep, and herds of Cattle, if the difficulty of ſupporting them through the winter, was obviated by a due knowledge of this practice.

86. The ſame premium is extended one year further.

CERTIFICATES to be produced on or before the firſt Tueſday in November, 1789.

87. STOCKS

87. STOCKS OF BEES. To the perſon who ſhall have in his poſſeſſion, being his own property, the greateſt number of Stocks of Bees, not fewer than thirty, and who ſhall in the moſt judicious manner provide for them plenty of ſuch vegetables as afford them honey and wax; the gold medal, or twenty pounds.

88. For the next greateſt number, not fewer than twenty ſtocks; the ſilver medal, or ten pounds.

Proper Certificates of the number of Stocks, and that they have been in the poſſeſſion of the Claimant during the preceding ſummer, together with a particular account of the vegetables provided for their ſuſtenance, and the manner in which they have been managed, to be produced

to the Society on or before the firſt Tueſday in November, 1789.

89. The ſame premium is extended one year further.

CERTIFICATES to be delivered on or before the laſt Tueſday in November, 1790.

90. CULTIVATING THE TRUE RHUBARB. For having raiſed before the end of the year 1788, the greateſt number of plants, not leſs than three hundred, of Rheum Palmatum, or true Rhubarb; the gold medal.

91. For the next greateſt quantity, not leſs than two hundred plants; the ſilver medal.

CERTIFICATES of the number of plants, that they ſtand at leaſt four feet aſunder, that they have been in a thriving ſtate

ſtate during the preceding ſummer, with an account of the ſoil, culture, and aſpect, to be produced on or before the ſecond Tueſday in February, 1789.

92, 93. The ſame premiums are extended one year further.

CERTIFICATES to be produced on or before the ſecond Tueſday in February, 1790.

94. RHUBARB. For the greateſt quantity of Rhubarb of Britiſh growth, not leſs than twenty pounds weight, equal to ſuch as is commonly ſold in the ſhops, under the name of Turkey, or Ruſſia Rhubarb; five pounds of which to be produced as a ſample, with Certificates that the remainder is of equal goodneſs; and a particular Account of the manner of culture and cure, on or be-

fore the firſt Tueſday in November, 1788; the gold medal.

95. For the next greateſt quantity not leſs than ten pounds weight; the ſilver medal.

96, 97. The ſame premiums are extended one year further.

The Samples and Certificates to be produced on or before the firſt Tueſday in November, 1789.

98. ASCERTAINING THE COMPONENT PARTS OF ARABLE LAND. To the perſon who ſhall produce to the Society the moſt ſatisfactory ſet of experiments, to aſcertain the due proportion of the ſeveral component parts of Arable Land, in one or more counties in Great Britain, by an accurate analyſis of it, and who having made a like ana-

lyſis

lyſis of ſome poor land, ſhall, by comparing the component parts of each, and thereby aſcertaining the deficiencies in the poor ſoil, improve a quantity of it, not leſs than two acres, by the addition of ſuch parts as the former experiments ſhall have diſcovered to be wanting therein, and therefore probably the cauſe of its ſterility; the gold medal.

It is required that the manurings, ploughings, and crops of the improved land, be the ſame after the improvement as before, and that a minute account of the produce in each ſtate; of the weather, and of the various influencing circumſtances, together with the method made uſe of in analyſing the ſoils, be produced, with proper certificates, and the chemical reſults of the analyſis, which are to remain the property of the Society, on or before the laſt Tueſday in November, 1788.

It is expected that a quantity, not less than six pounds, of the rich, of the poor, and of the improved soils, be produced with the Certificates.

N. B. Among the methods or processes made use of by Chemists, and called DRY or MOIST, the latter only appears adapted to the ascertaining the respective proportions of the component parts of Arable earth.—Dr Shaw, in his Chemical Lectures.—Dr Home, in his principles of Agriculture. Dr George Fordyce, in his Elements of Agriculture, and Sir Torben Bergman, in his 'Dissertation sur les Terres geoponiques,' have treated of these subjects.

99. The same premium is extended one year further.

The Accounts to be produced on or before the last Tuesday in November, 1789.

100. The

100. The ſame premium is extended one year further.

The Accounts to be produced on or before the laſt Tueſday in November, 1790.

101. The ſame premium is extended one year further.

The Accounts to be produced on or before the laſt Tueſday in November, 1791.

102. The ſame premium is extended one year further.

The Accounts to be produced on or before the laſt Tueſday in November, 1792.

103. IMPROVING LAND LYING WASTE. For the beſt Account of a method

method of improving any of the following ſoils, being land lying waſte or uncultivated, viz. Clay, Gravel, Sand, Chalk, Moor or Peat-earth, and Bog; verified by experiments on not leſs than ten acres of land, to be produced on or before the ſecond Tueſday in December, 1788; the gold medal for each.

104. For the next in merit; the ſilver medal.

The ſoil, manner of improvement, expenſe and product, are required to be fully explained.

105, 106. The ſame premiums are extended one year further.

The Accounts to be produced on or before the ſecond Tueſday in December, 1789.

107, 108.

107, 108. The ſame premiums are extended one year further.

The Accounts to be produced on or before the ſecond Tueſday in December, 1790.

109. MANURES. To the perſon who ſhall give the moſt ſatisfactory Account, verified by accurate experiments, on what ſoil the application of Marl, Chalk, Lime, or Clay ſeverally, as manures, be moſt beneficial; the gold medal.

It is required that each experiment be made on one acre, and that they be continued four years, the ſame kind of Grain being ſown the ſame year on the ſeveral ſpots.

It is alſo required, that if different manures are compared, the experiments be

be made on ſimilar ſoils, lying near each other.

An Account of the nature of the ſoil, manure, and the quantity laid on, with all expenſes and crops to be delivered, with ſpecimens of the ſoil and manure, on or before the firſt Tueſday in January, 1789.

110. The ſame premium is extended one year further.

The Accounts and ſpecimens to be produced on or before the firſt Tueſday in January, 1790.

111. MANURES. For the moſt ſatisfactory ſet of experiments, to aſcertain the comparative advantages of the following Manures, uſed as Top-dreſſings, on Graſs or Corn Land, viz. Soot, Coal-Aſhes, Wood-Aſhes, Lime, Night-Soil; the gold medal.

It

It is required that not leſs than half an acre of land be appropriated to each Manure, the ſoils ſimilar, and lying near each other, and if the Manure be uſed on Corn Land, then it is required that the ſame kind of Grain be ſown the ſame year on each ſpot; the experiments to be continued not leſs than two years.

An Account of the nature of the ſoil, quantity, and expenſe of the Manure and Crops, with Certificates to be produced on or before the firſt Tueſday in December, 1788.

112. The ſame premium is extended one year further.

The Account and Certificates to be produced on or before the firſt Tueſday in December, 1789.

113. IMPROVING WASTE MOORS For the improvement of the greateſt number

ber of acres of Waſte Moor Land, not leſs than one hundred; the gold medal.

It is required that the land before improvement, be abſolutely uncultivated, in a great meaſure uſeleſs, not let to any tenant, and without any building upon it except cottages or huts. That in its improved ſtate, it ſhall be encloſed, cultivated, and divided into fields, with buildings erected thereon, ſufficient for the uſe and reſidence of a tenant.

CERTIFICATES of the number of acres of the quality of the Moor ſo improved, of the mode and expenſe of the improvement; the ſtate it is in as to the proportion of graſs to arable, and the rent at which it is let; to be produced on or before the firſt Tueſday in February, 1789.

114. The ſame premium is extended one year further.

CER-

CERTIFICATES to be produced on or before the firſt Tueſday in February 1790.

115. IMPROVING WASTE MOORS. For the improvement of the greateſt number of acres of Waſte Moor Land, not leſs than one hundred; the gold medal.

It is required that the Land before improvement, be abſolutely uncultivated, and in a great meaſure uſeleſs, that in its improved ſtate it be encloſed, cultivated and divided into fields ſufficient for the uſe and occupation of a tenant.

CERTIFICATES of the number of acres of the quality of the Moor ſo improved, of the mode and expenſe of the improvement, the ſtate it is in as to the proportion of graſs to arable, and the average value thereof to be produced on or before the firſt Tueſday in February, 1791.

116. GAIN-

116. GAINING LAND FROM THE SEA. To the perſon who ſhall produce to the Society, an account of the beſt method, verified by actual experiment, of gaining Land from the Sea, not leſs than twenty acres, on the coaſt of England or Wales; the gold medal.

CERTIFICATES of the quantity of Land, and that the experiments were begun after the firſt of January, 1783, to be produced to the Society on or before the firſt Tueſday in October, 1788.

N. B. The Society have been credibly informed, that land has been gained on the coaſt of Holland, by fixing rows of whiſps of ſtraw upright in the ſand, at about a foot diſtant from each other, or by fixing ſtakes at proper diſtances from each other and whatling ſtraw bands between them.

117. The

117. The ſame premium is extended one year further.

CERTIFICATES to be produced on or before the firſt Tueſday in October, 1789.

118. The ſame premium is extended one year further.

CERTIFICATES to be produced on or before the firſt Tueſday in October, 1790.

119. The ſame premium is extended one year further.

CERTIFICATES to be produced on or before the firſt Tueſday in October, 1791.

120. MACHINE TO ANSWER THE PURPOSE OF REAPING OR MOWING CORN. For inventing a

Machine to anſwer the purpoſe of mowing or reaping Wheat, Rye, Barley, Oats, or Beans, by which it may be done more expeditiouſly and cheaper, than by any method now practiſed, provided it does not ſhed the Corn or Pulſe, more than the methods in common practice, and that it lays the ſtraw in ſuch manner as may be eaſily gathered up for binding; ten guineas.

The Machine with Certificates that at leaſt three acres have been cut by it, to be produced to the Society, on or before the ſecond Tueſday in December, 1788.

Simplicity and cheapneſs in the conſtruction, will be conſidered as principal parts of its merit.

121. The ſame premium is extended one year further.

To

To be produced on or before the ſecond Tueſday in December, 1789.

122. IMPROVED HOE. To the perſon who ſhall produce to the Society, the moſt improved or beſt conſtructed Horſe, or Hand-Hoe, ſuperior to any hitherto in uſe, for the purpoſe of clearing from Weeds, and looſening the Soil in, the intermediate ſpaces of all Crops of Corn, ſown in equidiſtant rows, and which ſhall earth up the young Plants at the ſame time; the gold medal, or twenty guineas.

A Hoe, with Certificates of its having been ſucceſsfully uſed, to be produced to the Society, on or before the firſt Tueſday in December, 1789.

123. DESTROYING THE GRUB OF THE COCKCHAFER. To the

perſon who ſhall diſcover to the Society, an effectual method, verified by repeated and ſatisfactory trials, of deſtroying the Grub of the Cockchafer, ſo deſtructive to the roots of all ſorts of Corn, Peas, Beans, and Turneps; the ſilver medal.

The Accounts to be produced on or before the firſt Tueſday in January, 1789.

Premiums

Premiums for Diſcoveries and Improvements in Chemiſtry, Dying and Mineralogy.

124. KELP. For the greateſt quantity, not leſs than four tons of Kelp, containing a much larger proportion of Alkaline Salt than any Kelp now made for ſale; twenty pounds.

A ſpecimen of one hundred weight, to be produced on or before the firſt Tueſday in January, 1789; together with Certificates that the whole quantity is equal to the ſpecimen, and made in Great Britain or Ireland, of Sea Weed.

125. BARILLA. For the greateſt quantity of merchantable Barilla, not leſs than half a ton, made from Spaniſh Kali, raiſed in Great Britain; the gold medal.

A ſample of not leſs than twenty-eight pounds, with a Certificate that half a ton

has been made; to be produced on or before the firſt Tueſday in January, 1789.

126. DISSERTATION ON ALKALI. To the perſon who ſhall compoſe the beſt diſſertation on the nature and qualities of vegetable and mineral Alkali, containing an account of their analogy to each other, and of the moſt eſſential properties wherein they differ; together with any uſeful remarks that may have eſcaped the notice of chemical Writers, explaining alſo the means of ſeperating them from each other, but more particularly from ſea ſalt, or other neutral ſalts which are frequently found united with them; ſo that when purified, they may be advantageouſly uſed in ſuch manufactures wherein the admixture of neutral ſalts is detrimental: Laſtly, an inveſtigation into the nature of their compoſition and the method of decompounding them into their conſtituent principles; the gold medal, or fifty pounds.

The

The Diſſertation to be produced to the Society, on or before the firſt Tueſday in March, 1789.

127. PRESERVING SEEDS OF VEGETABLES. For the beſt method of preſerving the Seeds of Plants in a ſtate fit for vegetation, a longer time than has hitherto been practiſed, ſuch method being ſuperior to any known to the publick, and verified by ſufficient trial; to be communicated to the Society on or before the firſt Tueſday in December, 1788; the gold medal.

128. DESTROYING SMOKE. For the beſt Account, aſcertained by proper experiments, of a method of deſtroying or burning the ſmoke of fires belonging to Steam Engines, Furnaces employed in calcining or ſmelting metals, or other large works, in order to prevent annoy-

ance to the neighbourhood; to be produced on or before the firſt Tueſday in January, 1789; the gold medal.

129. The ſame premium is extended one year further.

The Accounts to be produced on or before the firſt Tueſday in January, 1790.

130. CANDLES FROM RESIN. To the perſon who ſhall diſcover to the Society, the beſt method of ſo reducing the inflamable quality of Reſin, as to adapt it to the purpoſes of making Candles fit for common uſe, at a price much inferior to that of Candles made of Tallow only; the gold medal, or thirty guineas.

Six Pounds at leaſt of the Candles ſo prepared, with an Account of the proceſs, to be delivered to the Society, on

or

or before the firſt Tueſday in December, 1788.

131. SUBSTITUTE FOR OR PREPARATION OF YEAST. For diſcovering to the Society an effectual Subſtitute for Yeaſt, or preparation of Yeaſt, which after being kept two months, ſhall be fit for fermenting liquors, and raiſing bread; the gold medal, or twenty pounds.

Specimens of the Subſtitute, or of the preparation of Yeaſt, ſufficient for trials, together with a paper ſealed up, and containing an account of the compoſition of the Subſtitute, or method of preparing the Yeaſt, to be produced on or before the laſt Tueſday in November, 1788.

132. INCREASING STEAM. To the perſon who ſhall diſcover to the Society, a method, verified by actual experiments, of increaſing the quantity, or the

the force of Steam, in Steam Engines, with leſs fuel than is uſually employed, provided that in general the whole amount of the Expenſes in uſing Steam Engines may be conſiderably leſſened; the gold medal.

To be communicated to the Society on or before the firſt Tueſday in January, 1789.

N. B. As it is well known there are methods of preventing the ebullition of liquids, by the addition of particular matters in the boiling, it is ſubmitted to the conſideration of the ingenious, whether by the addition of ſome matters, or by ſome mechanical operations, the boiling and evaporation may not be increaſed?

133. The ſame premium is extended one year further.

To

To be communicated to the Society, on or before the firſt Tueſday in January, 1790.

134. PREVENTING THE DRY ROT IN TIMBER. To the perſon who ſhall diſcover to the Society, the cauſe of the Dry-Rot in Timber, and diſcloſe a certain method of prevention, ſuperior to any hitherto known; the gold medal.

The Accounts of the cauſe and method of prevention, confirmed by repeated experiments, to be produced to the Society on or before the ſecond Tueſday in December, 1788.

135. The ſame premium is extended one year further.

The Accounts to be produced on or before the ſecond Tueſday in December, 1789.

136. FINE

136. FINE BAR IRON. To the perſon, in England or Wales, who ſhall make in the year 1788, the greateſt quantity of Bar Iron, not leſs than ten tons, with Coak from Coak Pigs, equal in quality to the beſt Iron imported from Sweden or Ruſſia, and as fit for converting into Steel; the gold medal.

Samples, not leſs than one hundred weight, with Certificates that the whole quantity is of equal quality, to be produced to the Society, on or before the firſt Tueſday in January, 1789.

137. The ſame premium is extended one year further.

SAMPLES and CERTIFICATES to be delivered on or before the firſt Tueſday in January, 1790.

138. METHOD OF PREPARING WHITE LEAD WHICH SHALL NOT

NOT BE PREJUDICIAL. To the perſon who ſhall diſcover to the Society, a method of preparing White Lead, in a manner that ſhall not be prejudicial to the health either of the workmen employed in making or uſing it, and will anſwer all the purpoſes for which White Lead is at preſent uſed; fifty pounds.

A quantity of the White Lead ſo prepared, with an account of the proceſs made uſe of, and Certificates that not leſs than one ton has been manufactured in the ſame manner, to be produced to the Society on or before the ſecond Tueſday in November, 1789.

163. SUBSTITUTE FOR THE BASIS OF PAINT. To the perſon who ſhall produce to the Society the beſt ſubſtitute, ſuperior to any hitherto known, for the Baſis of Paint, equally proper for the

the purpoſe as the White Lead now employed; ſuch ſubſtitute not to be of a noxious quality, and which may be afforded at a price not materially higher than that of White Lead; thirty pounds.

A quantity of the Subſtitute, not leſs than fifty pounds weight, with an Account of the proceſs uſed in preparing it, and Certificates that at leaſt five hundred weight has been manufactured, to be produced to the Society, on or before the ſecond Tueſday in November, 1789.

Premiums

Premiums for promoting the Polite Arts.

140. HONORARY PREMIUMS FOR DRAWINGS. For the beſt Drawing of any kind, made with Crayons, Chalk, Black Lead, Pen, Indian Ink, or Biſter, by young Gentlemen under the age of twenty-one, ſons or grandſons of Peers or Peereſſes, in their own right, of Great Britain or Ireland; to be produced on or before the firſt Tueſday in March, 1789; the honorary medal of the Society in gold.

141. The ſame in ſilver, for the ſecond in merit.

142, 143. The ſame premiums will be given on the like conditions, to young Ladies, daughters or grand daughters of Peers or Peereſſes, in their own right, of Great Britain or Ireland.

144. HO-

144. HONORARY PREMIUMS FOR DRAWINGS. For the beſt Drawings of any kind made with Crayons, Chalk, Black Lead, Pen, Indian Ink, or Biſter; by young Gentlemen under the age of twenty-one.

To be produced on or before the firſt Tueſday in March, 1789; the gold medal.

145. For the next in merit; the ſilver medal.

146, 147. The ſame premiums will be given for Drawings by young Ladies.

N. B. Perſons profeſſing any branch of the Polite Arts, or any buſineſs dependant on the arts of deſign, or the ſons or daughters of ſuch perſons, will not be admitted Candidates in theſe claſſes.

The

The following Premiums are offered in conformity to the Will of the late John Stock, of Hampſtead, Eſq.

148. SCULPTURE. For the beſt Model of the Buſt of his Royal Highneſs the Prince of Wales, as large as the life; to be produced on or before the third Tueſday in November, 1788; a ſilver medallion, with the following engraved inſcription: *The Premium given by the Society for the Encouragement of Arts, Manufactures and Commerce, in conformity to the Will of John Stock, of Hampſtead, Eſq.*

A Caſt from the Model to which the Premium is adjudged, is to remain the property of the Society.

149. PORTRAIT. For the beſt Copy, in Oil Colours, of a Portrait of the late JOHN STOCK, of Hampſtead, Eſq;

to be produced on or before the third Tueſday in November, 1788; a ſilver medallion, with the following engraved inſcription: *The Premium given by the Society for the Encouragement of Arts, Manufactures and Commerce, in Conformity to the Will of John Stock, of Hampſtead, Eſq.*

150. DRAWINGS OF OUTLINES. For the beſt Outline after an original group or caſt in plaſter of human figures, by perſons of either ſex under the age of ſixteen, the principal Figure not leſs than twelve inches; to be produced on or before the laſt Tueſday in November, 1788; the greater ſilver pallet.

151. For the next in merit; the leſſer ſilver pallet.

N. B. Theſe Drawings are to be made on Paper with Chalk, Black Lead, Indian Ink,

Ink, or Biſter; and the originals either to be produced to the Society, or to be referred to for their examination.

152. DRAWINGS OF MACHINES. For the beſt Perſpective Drawing, by perſons of either ſex, under the age of twenty one years, of the Model of a Crane, by Mr Bunce, in the Society's Repoſitory, ſhewing particularly the method of ſtopping the Wheel by the centrifugal force of the Ball, the greater ſilver pallet; to be produced on or before the third Tueſday in November, 1788.

N. B. Such Candidates as propoſe to make Drawings for this Premium, will be admitted by the Regiſter any day (Sundays or Wedneſdays excepted) between the hours of ten and two.

The Drawing to which the Premium is adjudged, is to remain the property of the Society.

153. DRAWINGS OF LANDSCAPES. For the beſt Drawing of a Landſcape after nature, by perſons of either ſex under twenty one years of age, to be produced on or before the third Tueſday in November, 1788; the greater ſilver pallet.

154. For the next in merit; the leſſer ſilver pallet.

Each Candidate muſt mention, on the front of the Drawing, from whence the View was taken; and the Drawings muſt be made with Chalk, Pen, Indian Ink, or Biſter.

155. HISTORICAL DRAWINGS. For the beſt Hiſtorical Drawing, being an

an original compoſition of five or more Human Figures; the height of the principal Figure not leſs than eight inches. To be made with Crayons, Chalk, Black Lead, Pen, Indian Ink, or Biſter, and to be produced on or before the third Tueſday in November, 1788; the gold pallet.

156. For the next in merit; the greater ſilver pallet.

157. ENGRAVING IN THE LINE MANNER. To the Engraver who ſhall produce to the Society, the beſt engraved Plate executed by himſelf of the dimenſions of not leſs than twenty inches by ſixteen inches, containing not fewer than three Human Figures, the principal figure not leſs than twelve inches high; to be engraved in the LINE MANNER, from any old or modern Picture, the Plate to be publiſhed by the Engraver.

The regular progreſs of the work from the firſt Proof of the etching, to the finiſhed impreſſion of the Plate, to be produced to the Society on or before the firſt Tueſday in February, 1789; the gold pallet, and twenty-five guineas.

158. The ſame premium is extended one year further.

The Impreſſions to be delivered on or before the firſt Tueſday in February, 1790.

159. SURVEYS OF COUNTIES. To the perſon who in the year 1791, ſhall compleat and publiſh an accurate ſurvey of any one County in England or Wales, on a ſcale of not leſs than one inch to a mile, for which rewards have not already been given by the Society; the gold medal, or fifty pounds.

CER-

CERTIFICATES of the Accuracy of the Survey, and that it was begun after the firſt of June, 1787, together with the Map, to be produced on or before the laſt Tueſday in January, 1792.

The Map to which the Premium ſhall be adjudged to remain the property of the Society.

N. B. The Society are already in poſſeſſion of Surveys of the following Counties, viz. Devonſhire, Derbyſhire, Somerſetſhire, Northumberland, Suffolk, Leiceſterſhire, Cumberland, and Lancaſhire.

160. NATURAL HISTORY. To the Author who ſhall publiſh in the year 1788, the Natural Hiſtory of any County of England or Wales; the gold medal.

It is required that the ſeveral natural productions whether animal, vegetable or

mineral, peculiar to the County or found therein, be carefully and ſpecifically arranged and deſcribed, in order that the Publick may be enabled to judge what Arts or Manufactures are moſt likely to ſucceed in ſuch County.

The Work to be delivered to the Society on or before the laſt Tueſday in January, 1789.

161. The ſame Premium is extended one year further.

The Work to be delivered to the Society, on or before the laſt Tueſday in January, 1790.

CON-

CONDITIONS.

No perſon who has gained the firſt Premium in any Claſs, will be admitted a Candidate in a Claſs of an inferior age; and no Candidate ſhall receive more than one Premium in one year; nor will they, who for two ſucceſſive years, ſhall gain the firſt Premium in one Claſs, be ever again admitted as Candidates in that Claſs.

No Perſon ſhall ever be admitted a Candidate in any Claſs, in which he has three times obtained the whole of the firſt Premium.

No Candidate ſhall ſend in more than one Performance in any one Claſs.

All the Claims which are produced each year, before the Committee of Polite Arts (to which Premiums or Bounties are adjudged)

judged) are to remain with the Society ſix weeks after the determination, unleſs the Candidates, for particular reaſons, do apply to have the performances returned.

No Claim for a Premium in the Polite Arts will be admitted, that has obtained, or has been produced in order to obtain a Premium, Reward or Gratification from any other Society, or any Academy or School.

All Performances that obtain Premiums in the Polite Arts, muſt be begun after the publication of ſuch Premiums.

Purpoſely to encourage real merit, and to prevent any attempts to impoſe on the Society, by producing Drawings which ſhall have been made or retouched by any other Perſon than the Candidate, the Society is reſolved upon all occaſions, with reſpect

reſpect to the ſucceſsful Candidates in Claſſes 150 to 156 incluſive, to prove their abilities, by requiring a ſpecimen made under the inſpection of the Committee of Polite Arts, in every inſtance where ſuch proof can be obtained.

Premiums

Premiums for encouraging and improving Manufactures.

162. SILK. For the greateſt quantity of merchantable Silk, not leſs than five pounds, produced by any one Perſon in England, in the year 1788; the gold medal.

Specimens of the Silk, not leſs than one pound, with Certificates that the whole is of equal quality, and produced in England; to be delivered to the Society on or before the firſt Tueſday in January, 1789.

163. For the ſecond greateſt quantity, not leſs than two pounds; the ſilver medal.

164. MACHINE FOR CARDING SILK. For the beſt Machine, ſuperior

to

to any now in uſe, for carding Waſte Silk equally well as by hand; to be produced together with a ſpecimen of the Cardings, on or before the firſt Tueſday in November, 1788; the gold medal, or twenty pounds.

165. WEAVING FISHING NETS.

For the beſt ſpecimen of Plain Netting, for Fiſhing Nets, not leſs than twenty yards long, and ſix feet deep, woven in a Loom, or other Machine; to be produced to the Society, on or before the ſecond Tueſday in January, 1789; twenty guineas.

N. B. It is expected that the Specimen produced, be made in ſuch a manner, as to be cut and joined without more loſs than uſual, that it have ſuch a plain ſelvage as the common Fiſhing Nets, and that the Knot be equally faſt with thoſe

in

in Nets in common uſe, and as eaſily repaired.

166. A ſtrong CLOTH being prepared in SWEDEN, from HOP STALKS, or BINDS, the Society will give the gold medal, or twenty pounds, as a Premium for the beſt and greateſt quantity of ſuch Cloth, not leſs than twenty-five yards, made in England, and produced to the Society on or before the ſecond Tueſday in December, 1788.

One Pound at leaſt of the Thread to be produced with the Claim.

167. The ſame Premium is extended one year further.

The Cloth and Thread to be produced to the Society, on or before the ſecond Tueſday in December, 1789.

112. The

168. The ſame Premium is extended one year further.

The Cloth and Thread to be produced to the Society, on or before the ſecond Tueſday in December, 1790.

169. PAPER FROM RAW VEGETABLE SUBSTANCES. To the Perſon in England or Wales, who ſhall make the greateſt quantity, not leſs than ten reams, of the beſt and moſt uſeful Paper, from Raw Vegetable Subſtances; ten guineas.

CERTIFICATES of the making ſuch Paper, and one ream of the Paper to be produced on or before the firſt Tueſday in November, 1788.

170. The ſame Premium is extended one year further.

CER-

CERTIFICATES and Samples to be produced on or before the laſt Tueſday in November, 1789.

N. B. The Society are in poſſeſſion of two volumes, containing a great variety of ſpecimens of Paper made from Raw Vegetables, viz. Thiſtles, Potatoe-Haum, Poplar, Hop-Binds, &c. which volumes may be inſpected by any Perſon on application to the Regiſter.

Premiums

Premiums for Inventions in Mechanicks.

171. TRANSIT INSTRUMENT. To the Perſon who ſhall invent and produce to the Society, a cheap and portable Tranſit Inſtrument, which may eaſily be converted into a Zenith Sector, capable of being accurately and expeditiouſly adjuſted for the purpoſes of finding the Latitudes and Longitudes of places, and ſuperior to any portable Tranſit Inſtrument now in uſe; the gold medal, or thirty guineas.

To be produced on or before the laſt Tueſday in January, 1789.

172. GUN HARPOON. For every Whale taken by means of the Gun Harpoon; to the Perſon who firſt ſtrikes ſuch fiſh therewith; two guineas.

N. B. Proper Certificates of the taking ſuch Whales, in the year 1788, ſigned

by the Maſter, or by the Mate when the Claim is made by the Maſter; to be delivered to the Society, on or before the laſt Tueſday in December, 1788.

173. GUN FOR THROWING HARPOONS. To the Perſon who ſhall produce to the Society, the beſt improvement in the conſtruction of a Gun for throwing Harpoons, ſo as to render it more manageable than thoſe at preſent in uſe; the ſilver medal, or ten guineas.

The Gun to be produced to the Society, on or before the firſt Tueſday in December, 1788.

174. HARPOON TO BE THROWN BY A GUN. To the Perſon who ſhall produce to the Society, the beſt improvement in the conſtruction of a Harpoon to be thrown by a Gun; the Harpoon to be

be ſo contrived, that it may ſtrike and hold the Fiſh with more certainty and greater effect than any hitherto made uſe of; the ſilver medal, or ten guineas.

The Harpoon to be produced to the Society, on or before the firſt Tueſday in December, 1788.

175. CROSS BOW, OR OTHER INSTRUMENT FOR THROWING HARPOONS. To the Perſon who ſhall produce to the Society, the beſt conſtructed Croſs Bow, or other Inſtrument to be uſed in the Whale Fiſhery for throwing Harpoons, with more advantage and greater effect than the Gun, or any other Inſtrument now in uſe; the ſilver medal, or ten guineas.

To be delivered to the Society, on or before the firſt Tueſday in December, 1788.

176. CROSS BOW HARPOON. For every Whale taken by means of a Harpoon, ſhot from a Croſs Bow; to the Perſon who firſt ſtrikes ſuch Fiſh therewith, two guineas.

Proper Certificates of the taking ſuch Whales in the year 1788, ſigned by the Maſter, or by the Mate when the Claim is made by the Maſter; to be delivered to the Society, on or before the laſt Tueſday in December, 1788.

177. DRIVING BOLTS INTO SHIPS. To the Perſon who ſhall invent and produce to the Society, a Model ſhewing a method of driving Bolts into Ships, particularly thoſe of Copper, without ſplitting the Head or bending them, with more diſpatch in all directions and tighter than by any means hitherto known or in uſe; twenty guineas.

The

The Model to be produced to the Society, on or before the firſt Tueſday in February, 1789.

178. IMPROVEMENT OF THE HAND VENTILATOR. To the Perſon who ſhall produce to the Society, on or before the laſt Tueſday in February, 1789, a Portable Ventilator, to be worked by hand, better adapted and more efficacious for extracting foul air from Goals, Priſons and Ships, than any now known or in uſe; the gold medal, or twenty guineas.

179. CRANES FOR WHARFS. To the Perſon who ſhall invent and produce to the Society, a Model of a Crane for Wharfs, on a ſcale of not leſs than one inch to a foot, the conſtruction to be ſuch that the effect of the power may be varied according to the weight to be raiſed, in a manner different from any now known

or in uſe, yet more ſimple and effectual; the gold medal, or twenty guineas.

To be produced on or before the firſt Tueſday in February, 1789.

N. B. The Model ſhould neither be of the Walking Wheel nor Capſtan kind.

180. METAL ROPE OR CHAIN. To the Perſon who ſhall have invented a Chain or Rope of Copper, or other Metal, ſuperior to any hitherto made, ſufficiently flexible to work well and IN ALL DIRECTIONS over pullies, and which ſhall ſerve every purpoſe of a good Hempen Rope of at leaſt two inches diameter: the Candidate to produce to the Society ſatisfactory Certificates, that ſuch Metal Rope or Chain has been uſed to advantage in manufactories, or large works where Hempen Ropes have been hitherto employed; fifty pounds.

The

The Certificates and a Sample of the Metal Chain or Rope, not leſs than ten yards long, to be produced to the Society on or before the firſt Tueſday in November, 1789.

Although it is well known that the effect of the wind on horizontal Sails is greatly inferior to that on thoſe which move in a vertical direction, yet as there are ſome circumſtances and ſituations where it would be moſt convenient to erect an Horizontal Mill, the Society do therefore offer the following Premium.

181. HORIZONTAL WINDMILL. To the Perſon who ſhall invent and produce to the Society, a Model of an Horizontal Windmill on a ſcale of not leſs than one inch to a foot, ſuperior to thoſe already in uſe; the gold medal, or twenty guineas.

To be delivered to the Society, on or before the firſt Tueſday in February, 1789.

182. HAND MILL. To the Perſon who ſhall produce to the Society a better conſtructed Hand Mill, for general purpoſes, than any now known or in uſe; the ſilver medal, or ten guineas.

To be delivered to the Society, on or before the laſt Tueſday in December, 1788.

183. MACHINE FOR RAISING COALS, ORE, &c. &c. To the Perſon who ſhall invent a Machine for raiſing Coals, Ore, &c. from Mines, which ſhall produce the effect at a leſs expenſe than thoſe already known or in uſe; the gold medal, or twenty guineas.

A Model of the Machine made on a ſcale of not leſs than one inch to a foot; to be produced to the Society, on or before the ſecond Tueſday in February, 1789.

184. MACHINE FOR RAISING WATER. To the Perſon who ſhall invent a Machine, on a better, cheaper and more ſimple conſtruction than any hitherto in uſe, for raiſing Water out of Wells, &c. from a depth not leſs than fifty feet; thirty guineas.

CERTIFICATES of the performance of the Machine, and a Model of it, on a ſcale of not leſs than one inch to a foot, to be produced to the Society, on or before the firſt Tueſday in February, 1789.

185. MACHINE FOR CLEARING RIVERS. For the beſt Model of a Machine ſuperior to any now in uſe, for clearing

clearing Navigable Rivers from Weeds, at the leaſt expenſe; ten guineas.

To be produced to the Society, on or before the firſt Tueſday in February, 1789.

186. SECURING BUILDINGS FROM FIRE. To the Perſon who ſhall produce to the Society, the moſt ſpeedy and effectual method of extinguiſhing Fires in Houſes or other Buildings, ſuperior to any hitherto known or in uſe; the gold medal, or thirty guineas.

To be produced on or before the ſecond Tueſday in February, 1789.

Premiums

Premiums offered for the Advantage of the British Colonies.

187. NUTMEGS. For the greateſt quantity of merchantable Nutmegs, not leſs than five pounds weight, being the growth of his Majeſty's dominions in the Weſt Indies, and equal to thoſe imported from the Iſlands of the Eaſt Indies; the gold medal, or one hundred pounds.

Satisfactory Certificates from the Governor, Lieutenant-governor, Preſident of the Council, or Speaker of the Houſe of Aſſembly, of the place of growth, with an account of the number of trees, their age, nearly the quantity of fruit on each tree, and the manner of culture, to be produced on or before the firſt Tueſday in December, 1789.

188. The

188. The ſame Premium is extended one year further.

CERTIFICATES to be produced on or before the ſecond Tueſday in December, 1790.

N. B. Any Perſon deſirous of information on the ſubject of Nutmeg-trees, may obtain it from a Memorial on the fructification of the Nutmeg, and the ſureſt method of cultivating it to advantage, by the King's Gardener, at the Iſle of Bourbon, inſerted in Mr Maty's Review, for Auguſt, 1783.

189, 190. BREAD FRUIT TREE. To the Perſon or Perſons who, between the firſt of June, and the fifteenth of Auguſt, 1788, ſhall bring into the Port of London the greateſt number of Plants, of one or both ſpecies of the Bread Fruit Tree,

Tree, in a growing ſtate, not leſs than three of either ſpecies; the gold medal.

N. B. The Plants which obtain the Premiums are to be the property of the Society, to be diſpoſed of according to their diſcretion.

191. BREAD FRUIT TREE. To the Perſon who in the year 1789, ſhall convey from the Iſlands of the South Sea, to any of the Iſlands in the Weſt Indies ſubject to the Crown of Great Britain, the greateſt number not fewer than ſix, of one or both ſpecies of the Bread-fruit Tree in a growing ſtate; the gold medal.

CERTIFICATES, ſigned by the Governor, or Lieutenant-governor of the Iſland, of the importation of the trees, and of the ſtate they were in at the time of ſigning ſuch Certificates, to be delivered to the Society,

Society, on or before the ſecond Tueſday in October, 1790.

192. The ſame Premium is extended one year further.

CERTIFICATES to be produced on or before the ſecond Tueſday in October, 1791.

THE SOCIETY being informed that a conſiderable quantity of Oil can be obtained from the Seed of Corton, and that after the expreſſion of the Oil, the remaining Cake will afford a ſtrong and hearty Food for Cattle; and likewiſe, that the apparatus for the operation can be applied to the Mill for Sugar Canes, and worked in the rainy ſeaſon, at a moderate expenſe, have reſolved, for the foregoing reaſons, that the procuring Oil from the Seed of Cotton, is a proper object of

a Premium, conſidered as an encouragement for Planters to extend the cultivation of Cotton, an article eſſentially requiſite to encreaſe the manufacture of that commodity in this Country.

The Society therefore offer as follows:

193. OIL FROM COTTON SEED.

To the Planter in any of the Britiſh Iſlands of the Weſt Indies, who ſhall expreſs Oil from the ſeed of Cotton, and make from the remaining ſeed, hard and dry Cakes, as Food for Cattle; the gold medal.

CERTIFICATES that no leſs than one ton of the Oil has been expreſſed, and five hundred weight of the Cakes obtained, to be produced to the Society, with two gallons of the Oil, and two dozen of the Cakes, together with a full account

of

of the proceſs, on or before the laſt Tueſday in November, 1788.

194. For the next greateſt quantity not leſs than half a ton of Oil, and two dozen of the Cakes; the ſilver medal.

195, 196. The ſame Premiums are extended one year further.

CERTIFICATES and Samples to be produced on or before the laſt Tueſday in November, 1789.

197. SPIRIT FROM THE PULP OF THE COFFEE BERRY. To the Planter in any of the Britiſh Iſlands in the Weſt Indies, who ſhall diſtil the greateſt quantity of Spirit, from the Pulp of the Coffee Berry, not leſs than thirty gallons, and produce to the Society, one gallon of the Spirit, together with an account

count of the proceſs uſed in the making it; the gold medal.

198. For the next greateſt quantity not leſs than fifteen gallons; the ſilver medal.

CERTIFICATES ſigned by the Governor, Lieutenant-governor, or ſome perſons of known credit in the iſland, to be delivered to the Society, on or before the firſt Tueſday in January, 1789.

199. SENNA. To the Perſon who ſhall import into the Port of London, in the year 1788, the greateſt quantity of Senna, not leſs than two hundred weight, the growth of any of the Britiſh Iſlands in the Weſt Indies, and equal to the ALEXANDRIAN SENNA, now uſed for medicinal purpoſes; the gold medal.

CERTIFICATES of the growth and method of culture, to be produced to the Society, on or before the firſt Tueſday in February, 1789.

200. The ſame Premium is extended one year further.

CERTIFICATES to be produced on or before the firſt Tueſday in February, 1790.

201. KALI FOR BARILLA. To the Perſon who ſhall cultivate in the Bahama Iſlands, or any other part of his Majeſty's Dominions in the Weſt Indies, in the year 1788, the greateſt quantity of land, not leſs than five acres, with Spaniſh Kali, fit for the purpoſe of making Barilla; the gold medal.

202. For the next greateſt quantity, not leſs than three acres; the ſilver medal.

CER-

CERTIFICATES ſigned by the Governor, Lieutenant-governor, or other chief Magiſtrate, of the quantity of land ſo cultivated, and of the ſtate of the Plants at the time of ſigning ſuch Certificates, to be delivered to the Society, on or before the ſecond Tueſday in November, 1789.

203. The ſame Premium is extended one year further.

CERTIFICATES to be delivered on or before the ſecond Tueſday in November, 1790.

204. CASHEW GUM. To the Perſon who in the year 1789, ſhall import into the Port of London, from any of the Britiſh Iſlands in the Weſt Indies, the greateſt quantity not leſs than half a ton, of the Gum of the Caſhew Tree, which on trial has been found to anſwer the purpoſe of Gum Senegal, in Calicoe-

printing, Silk-dying, &c. the gold medal, or thirty guineas.

A Sample not leſs than twenty pounds weight, and Certificates that the whole quantity is of the ſame quality and free from leaves and dirt, to be produced to the Society, on or before the ſecond Tueſday in January, 1790.

205. The ſame Premium is extended one year further.

CERTIFICATES and Samples to be produced on or before the ſecond Tueſday in January, 1791.

Society's

Society's Office, Adelphi, May 24, 1788.

Ordered,

That the several Candidates and Claimants to whom the Society shall adjudge Premiums or Bounties, do attend at the Society's Office in the Adelphi, on the last Tuesday in May, 1789, at twelve o'Clock at Noon, to receive the same; that Day being appointed by the Society for the Distribution of their Rewards: And before that Time, no Premium or Bounty will be delivered, excepting to those who are out of the Kingdom, or prevented by unavoidable Accidents.

In Cases where personal Attendance cannot be given, Deputies may be substituted to receive the Rewards.

GENERAL CONDITIONS.

Notwithſtanding the Society reſerve to themſelves the power of giving, in all Caſes, ſuch part only of any Premium as the Performance ſhall be adjudged to deſerve, or of withholding the whole, if there be no merit; yet the Candidates may be aſſured, the Society will always judge liberally of their ſeveral Claims.

It is required, that the Matters for which Premiums are offered, be delivered in without names or any intimation to whom they belong; that each particular thing be marked in what manner each Claimant thinks fit, ſuch Claimant ſending with it a paper ſealed up, having on the outſide a correſponding mark, and on the inſide, the Claimant's name and addreſs.

No

No Papers ſhall be opened, but ſuch as ſhall gain Premiums, unleſs where it appears to the Society abſolutely neceſſary for the determination of the Claim; all the reſt ſhall be returned unopened, with the Matters to which they belong, if inquired after by their Marks, within two years; after which time, if not demanded, they ſhall be publickly burnt unopened at ſome meeting of the Society.

All Models of Machines, which obtain Premiums or Bounties, ſhall be the property of the Society.

All the Premiums of this Society are deſigned for that part of Great Britain, called England, the dominion of Wales, and the town of Berwick upon Tweed, unleſs expreſsly mentioned to the contrary.

The Claims ſhall be determined as ſoon as poſſible after the delivery of the Specimens.

No Perſon ſhall receive any Premium, Bounty or Encouragement, from the Society, for any Matter for which he has obtained, or propoſes to obtain a Patent.

A Candidate for a Premium, or a Perſon applying for a Bounty, being detected in any diſengenuous method to impoſe on the Society, ſhall forfeit ſuch Premium or Bounty, and be deemed incapable of obtaining any for the future.

The Performances which each year obtain Premiums or Bounties, are to remain with the Society, until the end of May, except as mentioned in the Conditions annexed to the Premiums offered for promoting the Polite Arts.

No Member of this Society, ſhall be a Candidate for, or entitled to receive any Premium, Bounty, or Reward whatſoever, except the Honorary Medal of the Society.

Where

Where Certificates are required to be produced in claim of Premiums, they ſhould be expreſſed as nearly as poſſible in the words of the reſpective advertiſements, and ſhould not be from the Candidate, (ſolely) but from ſome other perſon, or perſons, who have a poſitive knowledge of the facts certified.

Where Premiums or Bounties are obtained, in conſequence of ſpecimens produced, the Society mean to retain ſuch part of thoſe ſpecimens as they may judge neceſſary, making a reaſonable allowance for the ſame.

No Candidate ſhall be preſent at any meetings of the Society or Committees, or admitted at the Society's Rooms, after they have delivered in their Claims, until ſuch Claims are adjudged, unleſs ſummoned by the Committee.

N. B. Any

N. B. Any information or advice that may forward the designs of this Society for the public good, will be received thankfully, and duly considered, if communicated by letter, addressed to the Society, and directed to Mr. More, the Secretary, at the Society's office, in the Adelphi Buildings, London.

*** In case any Person should be inclinable to leave a sum of money to this Society, by will, the following form is offered for that purpose:

Item. I give and bequeath unto A. B. and C. D. the sum of upon condition and to the intent, that they or one

one of them, do pay the ſame to the Collector for the time being, of a Society in London, who now call themſelves the Society for the Encouragement of Arts, Manufactures and Commerce; which ſaid ſum of I will and deſire may be paid out of my perſonal eſtate, and applied towards the carrying on the laudable deſigns of the Society.

By order of the Society,

SAMUEL MORE, Secretary.

A LIST

A

LIST

OF

CONTRIBUTING MEMBERS.

N. B. Thoſe marked with ** pay five Guineas annually; thoſe marked with * Three Guineas annually, thoſe with P are Perpetual Members, thoſe with †† have ſerved the Office of Steward, and thoſe with † are Stewards elect.

A.

** ABERCORN, James Earl of
Ailesbury, Thomas Earl of
Affleck, Admiral Sir Edmund Bart, M. P.
†† Andrews, Sir Joſeph Bart. *Shaw, Berks*
Arden, Right Honourable Sir Richard Peppar M. P. Maſter of the Rolls
Arkwright, Sir Richard *Crumford, Derbyſhire*
Abbott, Mr Andrew, *Fleet-ſtreet*
Abbot, Lemuel Francis Eſq. *Caroline-ſtr. Bloomſbury*

Adair,

Abdy, Rev. Thomas *Cooper-ſale, Eſſex*
Adair, Alexander Eſq, *Pall-mall*
Adamſon, Mr David *Oxford-road*
Adam, James, Eſq. *Albemarle-ſtreet*
Adam, Robert Eſq. F. R. and A. S. *Ditto*
Adam, William Eſq. *Ditto*
Addington, William Eſq. *Clarges-ſtreet, Piccadilly*
Affleck, Admiral Phillip *Wimpole-ſtreet, Cavendiſh-ſquare*
Affleck, Captain William *Ditto*
Agace, Mr Daniel *Goldſmith-ſtreet, Cheapſide*
Aguilar Honourable Ephraim Baron, *Broad-ſtreet, Buildings*

P Alexander, Claud Eſq.
†† Allen, John Eſq. *Clements-Inn*
† Allen, William Eſq. *Southampton-row*
Almack, William Eſq.
Anderſon, David Eſq. *York-ſtreet, St. James's-ſquare*
Angerſtein, John Julius Eſq. *Pall-Mall*
P Anneſly, Honourable Richard, Eſq. *Dublin*
Anſell, Mr James *Craig's Court, Charing-croſs*
P Antrobus, Edmund Eſq. *New-ſtreet, Spring-gardens*
Armſtrong, Mr Moſtyn John *Norwich*
Arrow, Mr James *Rocheſter-row, Weſtminſter*
Artaud, Mr William *Ruſſel-ſtreet, Covent-garden*
P Aſhby, Shukbrugh Eſq, F.R.S. *Great Ormond-ſtreet*

Aſhton,

Aſhton, Mr Iſaac *Arundel-ſtreet*

Aſſer, Mr James,

P Aubert, Alexander Eſq, F.R. and A.S. *Auſtin-friars.*

Auriol, Mr James *Chancery-lane*

Auſtin, William M. D. *Cecil-ſtreet, Strand*

B.

P Bute, John Earl of

P Buchan, David Earl of L.L.D. F.R. and A.S.

Briſtol, Right Rev. Frederick Earl of F.R.S.

Balgonie, Lord

P Barrington, Honourable Daines, F.R. and A.S. *Temple*

Bruhl, His Excellency Count De *Dover-ſtreet*

Berchtold, Honourable Count *Prague in Bohemia*

P Blackett, Sir Thomas Bart.

Blacket, Sir Edward, Bart. F.A.S. *Clarges-ſtreet*

Bridgeman, Sir Henry Bart. M.P. *St James's-ſquare*

Bridger, Sir John *Combe, Suſſex*

Bacon, John Eſq. R.A. *Newman-ſtreet*

†† Bacon, John Eſq. F.A.S. *Temple*

Baker, John Eſq. *Princes-ſtreet, Spitalfields*

Baker, Mr John *Saliſbury-ſquare, Fleet-ſtreet*

Bancroft, Edward M.D. and F.R.S. *Charlotte-ſtreet*

P Barclay, David Eſq. *Red-lion-ſquare*

Baring, Francis Eſq. M.P. *Mincing-lane*

Baring,

Baring, John Esq. M.P. *Ditto*

Baratty, Simon Esq. *Gracechurch-street*

P Barnard, Mr William *Deptford*

Barnard, Mr Thomas *Adelphi*

Barret, Mr Bryant *Strand*

Barron, Mr Thomas *Salisbury-street, Strand*

Bartolozzi, Francis Esq. R.A. *North-end*

Bastard, John P. Esq. M.P. *Portland-place*

Bates, John Esq. *Wycombe-marsh, Bucks*

Batson, Robert Esq. *Limehouse*

Baverstock, Mr James *Windsor*

Bax, John Esq. *New Broad-street, City*

Bayley, Mr John *High-street, Mary-le-bone*

Baynes, Mr. John *Blackfriars-bridge*

Bean, Alexander Esq. *Drury-lane*

†† Beard, John Esq. *Doctors Commons*

* Beaufoy, Henry Esq. M.P. F.R.S. *Great George-street, Westminster*

Bell, William Esq. *Guernsey*

Bent, Ellis Esq. *Warrington*

Bennett, James Esq jun. *Fenchurch-street*

Beth, Thomas Esq. *Elm-court, Temple*

Bettesworth, Thomas Esq. *Mark-lane*

Birkhead, Charles Esq. *Riegate, Surry*

Bishop, Nathaniel Esq. *Bedford-square*

Blades, Mr John *Ludgate-hill*

Blackburn,

Blackburne, John Esq. M. P. *Park-street, Westminster*

Blake, Mr William *Aldersgate-street*

Bland, John Esq. *Lombard-street*

Blane, Gilbert, M.D. and F.R.S. *Sackville-street*

Blizard, Mr William F.R. and A.S. *Lime-street*

† Blofeld, Thomas Esq. *Serjeants-Inn, Fleet-street*

Bloxam, Matthew Esq. Sheriff for the County of Middlesex, *Soho-square*

P Boehm, Edmund Esq. *Sise-lane*

Bond, Mr William *Narrow-wall, New-Road, Surry*

Bontein, Captain James *Little Tower-hill*

* Bootle, Richard Wilbraham, Esq. M.P. F R.S. *Bloomsbury-square*

Boulton, Matthew Esq. F.R.S. *Soho, near Birmingham*

P Bowdoin, James Esq.

†† Boydell, John Esq. and Alderman *Cheapside*

Bramston, Thomas Berney Esq. M. P. *Albemarle-street*

Bramah, Mr Joseph *Piccadilly*

Braithwaite, Daniel Esq. F.R. and A.S. *Post-Office*

Brand, Thomas Esq. *Soho-square*

Bridges, Kemp jun. Esq. *Charlotte-street, Rathbone-place*

* Brereton, Owen Salusbury Esq. V.P. F.R, and A.S. *Soho-square*

Brehm, Major Diederick *South-molton-street*

Brickwood, Mr Nathaniel, *Castle-street, Thames-street*

P Broadhead, Theodore Henry Esq. *Portland-place*

Brown, Mr John *Holborn*

Brown, Mr Joseph *George-yard, Lombard-street*

Browne, Isaac Hawkins Esq. M.P. F.R.S.

Browne, Mr Robert *King's Mews*

Brownlie, John M.D. *Carey-street, Lincoln's-Inn*

Brudenell, George Bridges Esq. M.P. *Great George-street, Westminster*

Brummell, William Esq. *Charles-street, Berkley-square*

Bryer, William Esq. *Newman-street*

Bucknall, Thomas Skip Esq. *Conduit-street*

Bulcock, Mr William *Abroad*

Burgess, James Bland Esq. M.P. *Fludyer-street*

Bureau, Mr Daniel *Walbrook*

Bullock, Thomas Esq. *Pall-mall*

Burney, Mr John *Star-court, Bread-street*

Burrow, Mr Reuben *East-Indies*

Butts, Mr John *Fleet-street*

Byfield, Mr George *Manchester-buildings*

P Gardiff,

C.

P Cardiff, John Lord F.A.S.

P Carmarthen, Francis Marquis of F.R. and A.S.

** Chaulnes, Monſieur Le Duc De *Paris*

** Cavendiſh, Lord George

Compton, Lord M.P.

** Courtenay, William Lord Viſcount

Cremorne, Thomas Lord Viſcount

P Conway, Right Honourable General Henry Seymour M.P.

Cavendiſh, Honourable Henry F. R. and A. S. *Gower-ſtreet, Bedford-ſquare*

Cadell, Mr Thomas *Strand*

Calverley, Thomas Eſq. *Ewell, Surry*

Cameron, Donald Eſq. *Walbrook*

Campbell, Major General Archibald

Campbell, Duncan Eſq. *Adelphi*

Chambers, Chriſtopher Eſq. *Mincing-lane*

Carew, Reginald Pole Eſq.. M. P. *Charles-ſtreet, Berkley-ſquare*

Cazalet, Peter Eſq. *Auſtin-friars*

Carpenter, Mr Henry *Panton-ſtreet, Hay-market*

Chandler, Henry John Eſq. *Bentinck-ſtreet*

Changeux, Monſieur Pierre Jacques *Paris*

Charrington, John Esq. *Mile-end*

Chiswell, Richard Muilman Trench, Esq. *Portland-place*

Claggett, Charles Esq. St. *Alban's-street, Pall-mall*

†† Clarke, Richard Esq. Alderman, *Bridge-street, Blackfriars*

Clarke, Mr Henry *Broad-street*

Clarke, Mr Henry *Gracechurch-street*

P Clark, Mr James

Clark, Richard Esq. *Aldermanbury*

Close, Rev. Henry John *Ipswich*

Coghill, John Esq. *Coghill-hall, Yorkshire*

Colborne, Thomas Esq. *Queen Ann-street, West*

Cole, Mr Martin *Channel-row, Westminster*

P Colepepper, John Spencer Esq.

†† Collins, Thomas Esq. *Berners-street*

Collins, Mr William *Lambeth*

Collison, Mr John

Collinson, Thomas Esq.

Combrune, Gideon Esq. *Suffolk-street, Middlesex-Hospital*

Compton, Mr Henry *Charlotte-street, Pimlico*

†† Conant, Nathaniel Esq. *Lamb's-conduit-street*

Coney, William Esq. *Oriel College*

P Coningham, James Esq. *Pancras-lane, Queen-street, Cheapside*

Cooke,

Cooke, Benjamin Mus. D. *Dorſet-court, Weſtminſter*

Cooke, Rev. Mr James *Heaton-Norris, near Manchester*

Cook, Major William *Ormond-ſtreet*

P Cooper, Mr John *Portpool-ſtreet*

Cooper, Mr Benjamin *Clements-lane, Lombard-ſtreet*

Cope, William Eſq. *Sanctuary, Weſtminſter*

Copeley, Thomas Eſq. *Netherhall, near Doncaſter, Yorkſhire*

P Coppens, B. M.D. *Ghent, Flanders*

Cort, Henry Eſq. *Goſport*

Cotton, Charles Eſq. *Maddingly, Cambridgeſhire*

Coulſon, Jukes Eſq. *Thames-ſtreet*

Couſſmaker, Lannoy Richard Eſq. *Warnford-court*

Craddock, Joſeph Eſq. *Grumley, Leiceſterſhire*

Cranke, Mr William *Biſhopſgate-ſtreet*

Crathorne, Henry Ralph Eſq. *Yorkſhire*

Crawſhay, Richard Eſq. *George-yard, Thames-ſtreet*

Crawley, Samuel Eſq. *Argyle-ſtreet*

Crawley, Mr William *Biſhopſgate-ſtreet*

Creak, Mr William *Cornhill*

Crewze, Francis Eſq. *Lowlayton, Eſſex*

Criſp, John Eſq. *John-ſtreet, Adelphi*

Croft, Richard jun. Eſq. *Pall-mall*

Cropley, Rev. William *Weſt Ham*

Crowcher, John Esq. *Densworth, near Colchester*

Crowder, William Henry Esq. *Frederick's-place, Old jewry*

D.

**Devonshire, William Duke of

**Dartmouth, William Earl of F.R.S.

P Dolben, Sir William Bart. V.P. M.P. *Duke-street, Westminster*

Dagge, Henry Esq. F. R. S. *Great Russel-street, Bloomsbury*

Dancer, Mr John *Doncaster*

Daniell, James Esq. *Welbeck-street*

Darch, Lieut. Col. Thomas, *Gower-street, Bedford-square*

†† Davenport, John, Esq. *Tavistock-street, Covent-garden*

Davenport, Richard Esq. *Paul's Wharf*

* Davison, James Esq. V.P. *Charles-street, Cavendish-square*

D'Aubant, Leiut. Col. Abraham, F.A.S. *Wimpole-street*

Dehany, Phillip Esq. *Queen-Ann-st. Cavendish-square*

† Delamain, John Esq. *Margaret-street, Ditto.*

Delafield,

Delafield, Joſeph Eſq. *Caſtle-ſtreet, Long-Acre*
Dent, Robert Eſq. *Temple-bar*
De Sauſeuil, le Chevalier *Paradiſe-row, Chelſea*
Deſanges, Mr William *Wheeler-ſtreet, Spitalfields*
Deſenfans, Noel Eſq. *Charlotte-ſtreet, Portland-place*
Deſbarres, Joſeph Frederick Wallet Eſq. *Abroad*
Deformeaux, Mr James Lewis, *Pearl-ſtreet, Spitalfields*

Deval, Mr John, *Portland-ſtreet*
Devaynes, John Eſq. *Spring-gardens*
Dickinſon, Charles Eſq. *Abroad*
Dickinſon, Mr William, *Old-Bond-ſtreet*
Dobbyn, Hannibal, Eſq. *Suffolk-ſtreet, Charing-croſs*
Dodſley, Mr James *Pall-mall*
Dolben, John Engliſh Eſq. F.A.S.
Dollond, Mr Peter St. *Paul's Church-yard*
Dollond, Mr John *Ditto*
Dorſett, George Eſq. *New Bond-ſtreet*
Douce, Thomas Auguſtus Eſq *Townmaling, Kent*
* Douglas, Captain Peter *Abroad*
Dowden, Mr John *Alton, Hants*
†† Dower, Robert Eſq. *Middle Temple*
Downman, John Eſq. *Leiceſter-fields*
Drake, George Eſq. *Bedford-ſquare*
Drake, Mr Samuel *Margaret-ſtreet, Weſtminſter*
Draper, Mr John, *Maze-pond, Southwark*

Drew,

Drew, Mr Thomas *Charlottee ſtreet, Portland-place*

P Dreyer, Mr Maurice

Duberly, James Eſq. *Piazza, Covent-garden*

Dubourg, Mr Richard *Duke-ſtreet, Mancheſter-ſquare*

Dubufe, Mr Claude *Vincennes* near *Paris*

Dunn, Samuel Eſq. *Adelphi*

Dunn, Mr Edward *Mount-ſtreet, Groſvenor-ſquare*

P Duroure, Lieutenant Colonel F.R. and A.S. *Old Burlington-ſtreet*

Duval, Mr John Peter *Hackney*

E.

P Effingham, Thomas Earl of

P Egremont, George Wyndham Earl of

Earle, Henry Eſq. *Temple*

Eaton, Rev. Stephen St. *Ann's Soho*

P Eaton, Peter Eſq. *Weſtford, Eſſex*

Eaton, Richard Eſq. *Lincoln's Inn*

P Eckerſall, John Eſq. *Burford-houſe* near *Dorking, Surry*

Edgworth, Richard Lovell, Eſq. F.R.S.

Edwards, George Eſq. *Barnard-caſtle*

Edwards, Mr Samuel *Stamford, Lincolnſhire*

P Egan, James, L.L.D. *Royal-park Academy, Greenwich*

P Ellott,

P Ellicott, Mr Edward *Royal Exchange*
Ellill, John Esq. *Queen-street, Cheapside*
Elmsly, John Esq. *Oriel College*
P Errington, John Esq. *Hill-street*
Errington, George Esq.
Evans, Mr John *Pope's Head Alley*
Evans, Morgan Esq. *Lincoln's Inn*
*††Ewer, Samuel Esq. *Lincoln's-inn-fields*

F.

Fife, James Earl of M.P. F.R. and A.S.
P Fitzwilliam, Richard Lord Viscount F.R.S.
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